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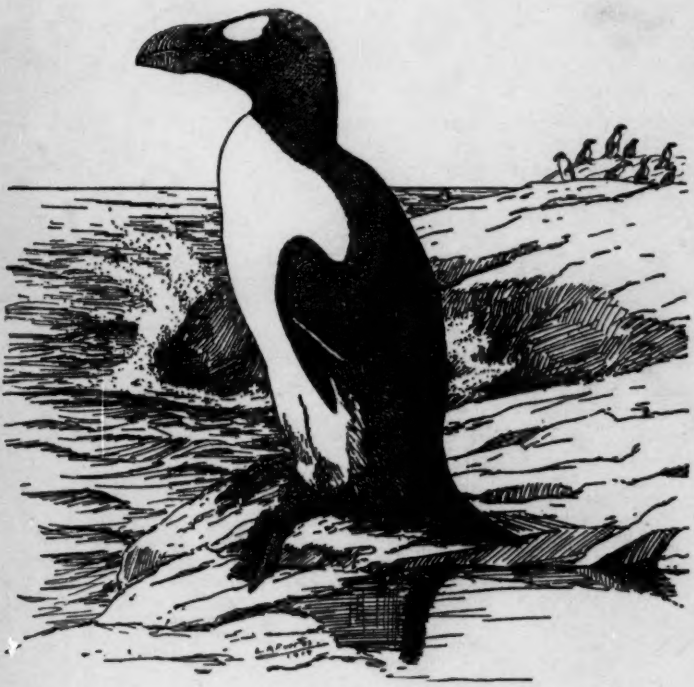

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UPPER: SPOTTED OWL, NEST AND EGGS.
LOWER: SPOTTED OWL RESTING IN TREE.

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HABITS OF THE SPOTTED OWL (SYRNIUM OCCIDENTALE.)

BY J. STOKLEY LIGON.

Plates XIX–XXI

THE Spotted Owl, although one of the most interesting birds of the southwest, is, because of its retiring habits and the character of country it occupies, known to comparatively few. Its weird notes piercing the still darkness of some supposed wild beast infested mountain fastness have sent chills through the veins of many a camper upon his introduction to its haunts.

For several years I have been closely associated with the Spotted Owl in its seclusive retreats of the southern Rocky Mountains, and this association has enabled me to study its habits rather carefully. It was not until the spring of 1925, however, that definite information was obtained relative to the nesting of the bird. I had previously seen nesting sites but because of inaccessibility or lack of necessary equipment with which to reach them, had not been able to investigate them in detail.

Vividly do I remember the first Spotted Owls that I ever saw, although at the time I did not know what Owl I had seen. This was while hunting bears with some companions in the autumn of 1908 in the roughs of the San Mateo Mountains in south central New Mexico, my first visit to these interesting and rugged mountains where I eventually collected eggs of the bird. I later occasionally observed the birds while on hunting trips in these and other mountains of that region. It was five or six years later,

while making some observations for the Biological Survey, that I began, through a rather singular circumstance, to make a more careful study of the birds. Dr. E. W. Nelson, now Chief of the Biological Survey, wrote me relative to a certain Owl of that region, which he stated was a little smaller than the Great Horned Owl and of which skulls, but not complete specimens had been obtained. I informed him that I thought I had seen the species to which he referred, having in mind the two I had seen sitting side by side in a fir tree in the San Mateo Mountains, and the few others subsequently observed. Specimens were secured and sent to the Biological Survey and I was advised that this was the bird desired. I collected a series of them over a wide range in New Mexico for the Biological Survey, and the collecting of these specimens brought an ever increasing interest in the birds.

The Spotted Owl is resident where found and entirely nocturnal; I have never seen it in action in daylight, unless forced from its perch or disturbed at its nest. This accounts largely for its being so little known. So far as I am aware, it is entirely beneficial, feeding almost exclusively on small rodents. In nearly every instance the stomachs examined by me contained parts of the large wood rats that inhabit the country to which the Owls are indigenous. The adult birds are rarely seen solitary; they are nearly always in pairs throughout the year. They are by no means as scarce in favored sections of their range as one unfamiliar with their habits might believe. I have observed them over rather an extensive range in the mountains of New Mexico and Arizona, but most commonly through south central New Mexico in the Sacramento Mountains, San Mateo Mountains, Black Range and Mogollon Mountains and in corresponding latitudes in eastern Arizona. They have been noted by me, although not commonly, as far north in New Mexico as the Sangre De Cristo Range, east of Taos.

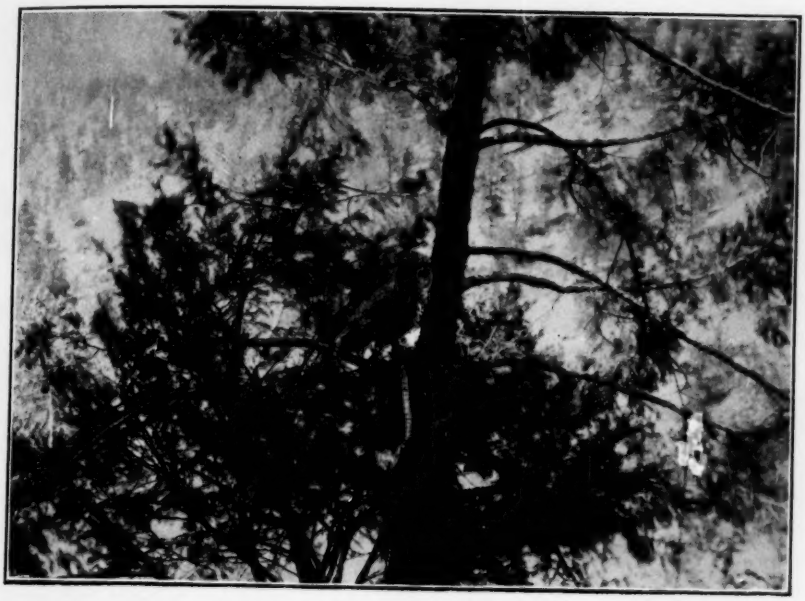
The favored haunts of the bird are deep, narrow, timbered canons where there are always cool shady places, at elevations ranging from 6,500 to 9,000 feet. They are usually to be found sitting in young spruce or fir trees or in a cave or crevice in the shaded canyon wall; cliffs and caves being one of the range requirements of the birds in the region referred to. They may be

observed in the quietest and most inaccessible mountain sections. The birds are very often seen sitting twenty or thirty feet from the ground on a small horizontal limb near the trunk of a spruce or fir. Not often have I seen them out of the spruce and fir zone. They appear little disturbed by intruders, only casually looking sleepily at one. Their haunts are nearly always rendered conspicuous by the white droppings, and a tree in which they perch during the day can be located by observing the droppings at the base. Fortunately for them, in view of their unconcern, their color harmonizes well with their surroundings, such as the cliffs, and their habits are such that the casual observer is not likely to notice them, or they would commonly be the victims of thoughtless vandalism, as one generally needs nothing more than a stone or stick to kill a Spotted Owl. So fearless or reluctant were they to leave a perch to which they had become attached that by quiet maneuvering I have caught the birds by hand. They appear to fear man no more than they do any other creature and seem more annoyed than frightened when driven from their day abode. Year after year the birds have been observed in the same places, probably due to the fact that in any given locality only a limited number of places favorable to them may be found.

The call of the Spotted Owl, though causing trepidation on the part of some, is thrilling and pleasing to the ear of the ornithologist and lover of nature. The principal call note, in my experience, consists of four distinct "coo's," the first short, followed by a pause, then two in more rapid succession, followed after another pause by a longer drawn out note with a falling tone, or it may be indicated thus: *coo—coo-coo——coo-o-o*. The last syllable is sometimes so delayed as to lead one to believe that the call is completed. The call when uttered at full volume is loud, clear and carries far, and in the stillness of the night is generally heard from some high cliff or from the top of a canyon wall. The note is generally uttered at intervals of a minute or longer. This same note, however, is often given soft and low during the day if the birds are molested. They also have a low two syllable *coo-coo* note and sometimes at night give a shrill whistle, drawn out to a high treble pitch. All notes of the bird appear to be subject to variation in tone as well as in pitch and volume.

The first clue to the nesting habits of the Spotted Owl was obtained when I learned that the birds commonly lived in caves or crevices in canyon walls, however, there was always difficulty in reaching the nesting sites, as they are generally situated in almost inaccessible places; in fact all nests that have been located by me, with the exception of one, have been found in such locations. Nesting begins in south-central New Mexico in late March and early April. Since the Owls do not leave their nests or day perches at the approach of an intruder, they rarely give any clue as to location of the nest as do most other birds.

On April 4, 1925, I located the first nest containing eggs; this nest was in the entrance of a cave, about which pine and fir trees grew, on the south side of a steep canyon. The cave faced the north, insuring perpetual shade, and had an opening about thirty-five feet high, forming a large circular room (see photograph) forty feet in depth. The nest, which was an old one reconstructed, was situated on a shelf about four feet wide and thirty feet from the floor of the cave on the east side of the entrance. The overhanging roof of the cave and the perpendicular wall on the side concealed the nest from above and only by the use of an improvised ladder could it be reached from below. It was constructed of pine limbs and twigs and some small clusters of dead pine needles, and was three feet or more in diameter. The cavity was about three inches deep and ten inches wide and contained no lining. Upon my first visit to the cave, the male bird was sitting on a natural perch or spire of which there were several in the interior of the cave, worn smooth and plastered with droppings as a result of much use on the part of the birds. As I entered the rocky, quarried floor of the cave, he displayed alertness and some uneasiness, rather uncommon for this bird, and sailed out and down into the thick fir saplings that grew on the steep shoulder of the canyon to the west. The top of the cave resembled the inside of a dome while the floor carried out almost the natural pitch of the canyon slope, which at this point was steep, to the exterior wall. By climbing up on the wall opposite to where I suspected the nest was located, the edge of the nest could be seen on the shelf to the right. Though I felt reasonably certain that the female bird was on the nest as feathers and



SPOTTED OWL IN TREE AND ON NEST.

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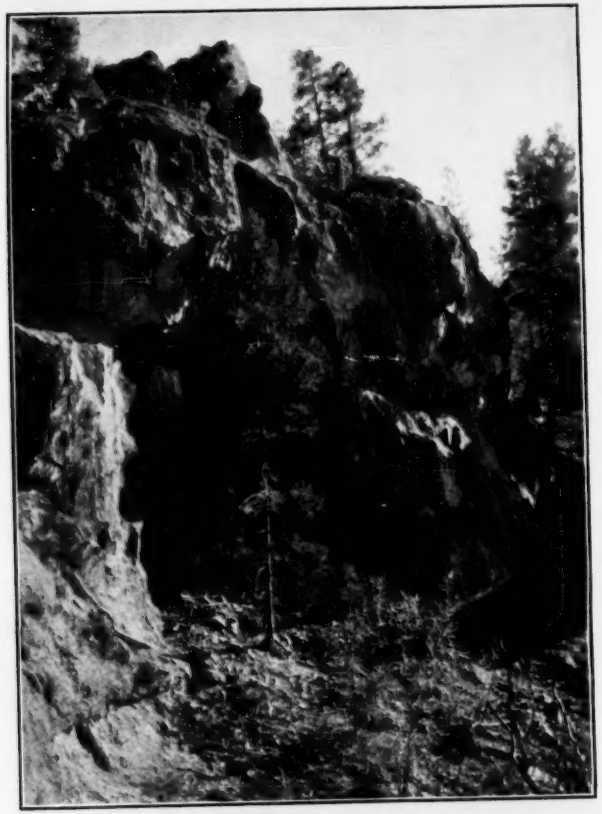
other signs indicated the nest was being used, I was not prepared to investigate it. On my return that afternoon with a companion a pole was cut and dragged into the mouth of the cave where it was leaned against the shelf on which the nest was located. I then climbed to the shelf and found the bird on three eggs. She did not leave the nest until I reached the shelf and was within a few feet of her; she then raised up, snapping her bill, scolding and fussing, and flew down on one of the interior perches. She displayed uneasiness by flying in and out of the cave, down the canyon side into a thick fir tree and then back into the cave, softly giving the call note of four syllables. The male bird down in the forest answered but never appeared.

Thinking that probably the full complement of eggs had not been laid, I decided to leave them and return later. In the meantime, on April 6, while hunting mountain-lions further to the south, I located another nest in a narrow box canon, the southern slope of which, wherever there was footing, supported a rather thick growth of young fir, fifty to seventy-five feet high. I knew this particular place to be an Owl haunt and also knew there were some old nests in the caves and crevices of the canyon wall. I investigated several old nests but none of these showed signs of having been used this season; however, up in a narrow cave or rent, which penetrated well back into the cliff that stood behind the evergreens was evidence that the Owls were inhabiting the place. An old nest in the cave was inspected and as I was about to leave it, I discovered at the entrance of the cave, about twenty-five feet up in the side wall to my left, projecting sticks and a few clinging feathers in a natural cavity or pocket. I managed to climb up a little on the opposite wall and from there I saw the top of the bird's head on the nest. The male bird was located in a spruce nearby. That afternoon I returned to the cave and placed a pole so that I was able to climb to the nest. The bird remained at its post through all this commotion but when I reached the nest she snapped her bill and flew out, almost striking me in the face as she passed. This nest contained two eggs. The cavity, which could not have been more suitable if made to order, was just large enough to permit of the construction of the nest, about three feet high and three feet wide on the inside, with

a little smaller entrance. This nest, which was perpetually shaded, was an old one with little indication that it had recently been repaired. I did not take the eggs. Five nests were located at this point but only the one above described was being used. One of the vacant nests higher up on the canyon wall was in a pocket almost identical with the one that contained the nest with eggs. The bird at the nest containing the eggs stayed nearby, fretting and calling; but her mate did not appear although he answered her calls occasionally from somewhere below in the spruce. I returned to this nest on April 12, or six days after discovering it, and found that it still contained only two eggs.

On April 9, I returned to the first nest found and it still contained the three eggs. On this visit I was prepared to take some pictures and in doing so had a most interesting time with the female bird; the male was not seen at this time, although he was heard answering the call notes of the female several times from the thick spruce in the canyon below.

At first the female was a little shy. When I would climb to the ledge on which the nest was constructed, she would snap her beak and fly into the tree in front of the cave, or perch on the accustomed stands back in the cave, all the time closely watching the nest; and when I would get down, she would lose no time in getting back on the eggs. Finally, I took my place on the ledge, which formed an elbow, the nest being on the outward exposure, with my camera in shape for action. I was within eight feet of the nest, crouched on the ledge; however, the bird would alight on the ledge near the nest, but whenever she glanced in my direction she would fly off. Sometimes she would alight in the tree opposite the nest and impatiently watch me and the nest alternately. Now and then she would give the call note in a restrained tone. Finally she became more reconciled to my presence and took advantage of the occasion to preen her plumage, sitting on the cave perches and occasionally casting her big, attractive, innocent eyes up at me and the nest location. She then began to display one of the Owl's dominant traits—patience—which I could not match; she was at home while I was a long way from camp, in a rough country with a heavy pack to carry. I crawled down, secured a fir bough and placed it, as a blind, between my



NESTING CAVE AND NEST OF THE SPOTTED OWL.

location and the nest. After a few minutes the bird was on her nest and permitted me to take several exposures through an opening in the bough. I then removed the bough but when I endeavored to ease up nearer, she left the nest again. I was preparing to take a close-up view of the nest and eggs when she deliberately flew up, walked in on the side of the nest and sullenly sat down four feet away, facing me with feathers slightly ruffled, blinking her eyes with a determination to guard her treasures. She remained there stone-still regardless of my movements. By the time I had made several exposures of the bird and its nest and eggs, we had become quite friendly, and I had developed a high degree of admitarion for her devotion and courage in defending her home. I took the eggs but did not harm her and I trust she laid another clutch, for she had a nesting site that might well be coveted by all other Spotted Owls of that locality.

On April 10, in the same mountains, a third nest was found in a dense abnormal growth of Douglas fir, generally termed "witch limbs" and common among the trees in this region. The first two nests located were each at about 7,000 feet elevation, but this one was at 7,500 feet or higher, in the bed of a canyon. While walking up the canyon, where there was a rather thick growth of spruce and fir, I noticed one of the birds, evidently the male, just ahead of me, about fifteen feet from the ground, in a small white fir. I laid down my pack and sat on it to rest and, incidentally, to observe the bird which seemed more curious than disturbed at my presence. I had been there only a minute or two when it looked dreamily away and gave the four syllable call, rather softly, as if it were a love note. To my surprise an answer came from, I presumed, a fir tree that stood alone in a little smooth space just out of the canyon bed behind me. The day was clear and pleasant and the hour about 2 o'clock in the afternoon.

I had suspected that the Spotted Owl nested in the "witch limbs" of Douglas fir, as such examples of tree growth were often noted where the Owls were seen. The tree in question was 16 inches in diameter at the base with no limbs below the mass that encircled it fifteen feet or more from the ground. There was indication of a nest in the base of the limbs; and deciding that the unseen Owl was in this tree, I threw a stone into the branches,

whereupon the female hopped up into one of the two openings that furnished easy access to the place. After some difficulty I climbed to the nest but found that the bird had not laid, although she was reconstructing what was evidently a nest that had been used before. While I was in the tree containing the nest, both birds fussed and flew about from tree to tree, giving in subdued tones all the varied vocal expressions that I had ever heard and some that were new to me. I sat on the edge of the nesting site for a few minutes observing their actions. In a short while a raucous-voiced audience of Long-crested Jays and Clark's Crows had collected and were clearly directing their complaints at me as well as at the Owls. These seemed to make no impression on the Owls and the intruders soon retired; neither were the Owls long flustrated, as both soon settled in trees not far apart and carried on a loving conversation. Among their other notes, they at last alternately indulged in their shrill whistling note, ventriloquial in effect and one would assume that this is a mating call.

On April 12, I visited this nest again and found it contained one egg. The birds were now more concerned at my presence than they were on my previous visit, and both remained near, flying from tree to tree, calling and fretting. In addition to the other familiar notes, this time one mewed cat-like several times. One is inclined to believe after association with these sober fellows, that they may possibly be more or less imitators of sounds that have become familiar to them.

On April 12, I returned to the second nest, which I had found on April 6, and it still contained only the two eggs, evidently the complement; probably two and three are the usual number laid by the birds. The three eggs that were in the first nest were considerably incubated when I took them and were all in about the same stage of advancement.

From what I can learn it would seem that the Spotted Owls of this locality belong to the typical form (*Syrnium occidentale*). The three eggs collected by me are now in the National Museum, Biological Survey collection. They are dull white with a very faint tinge of buff, shell faintly roughened, with no glaze apparent. The eggs are rounded ovate in shape and the measurements are 50.1 x 40.6, 49.9 x 41.5 and 48.0 x 40.6 millimeters.

Published nesting records of the Spotted Owl that I have seen are few. Bendire on April 17, 1872 (Life Histories North American Birds, 1892, p. 344), found a nest of this bird about 30 feet from the ground in a large and bushy cottonwood between Picacho Peak and Whipple Station in Arizona. This nest, built like that of a large Hawk, contained a single egg; "oval in shape and pure white in color," measuring 52.0 x 45.5 mm. He also cites a record of a nest containing four newly hatched young found by O. C. Poling, May 23, 1890, in a large cavity in an oak near the northern end of the Huachuca Mountains.

Nests have also been described by L. Peyton (Condor, 1910, pp. 122–123) who for three consecutive years found a pair breeding in a cavity in the face of a cliff in Fish Canyon, a tributary of Castaic Canyon, Los Angelus County, California. On April 1, 1909, two partly incubated eggs were taken at this site. On March 30, 1910, a second set of three eggs was secured from this same nesting cavity.

Donald R. Dickey, (Condor, 1914, pp. 193-202), on May 15, 1913, discovered a nest in a pot-hole high on the rock wall of a canyon in the Coast Mountains of Ventura County, California, that subsequently was found to contain two young. Mr. Dickey sets forth his impressions of his experience with these birds in a most graphic and interesting manner.

The egg taken by Bendire, which I examined in the collection of the U. S. National Museum, is distinctly more oval than the three that I have described. Bendire erred in noting it as pure white in color as it exhibits the same faint tinge of buff as those from the San Mateo Mountains, New Mexico. As the latter are freshly taken, it does not appear that variance from Bendire's description in the color of the older egg is due to age. The lack of gloss in all these specimens is especially noticeable when they are compared with series of the Barred Owl.

Santa Fe, New Mexico.

THE PRESENT DISTRIBUTION AND STATUS OF THE LESSER ANTILLEAN SOLITAIRES.

BY JAMES L. PETERS.

Plates XXII–XXIII

THE following brief account of the Lesser Antillean Solitaires is prompted by a short field-trip that I made during the winter of 1925 in the interests of the Museum of Comparative Zoölogy to the islands of Martinique, St. Lucia, and St. Vincent.

The impression has been current among naturalists for several years that the Solitaire on St. Vincent is extinct, and that the forms inhabiting St. Lucia and Martinique are threatened with a like fate. Fortunately such is not the case, and judging from my own observations there seems to me no reason why these retiring songsters should not continue to hold their own for many years to come.

Myiadestes genibarbis genibarbis Swainson. MARTINIQUE SOLITAIRE, SIFFLEUR DE MONTAGNE

From January 17 to 28, 1925, I was at Morne Rouge, a little town perched on a southerly spur of Mont Pelée. Hereabouts the "Siffleur," to give him the name by which he is best known on Martinique, is not uncommon in the steep ravines, where tree-fern and bamboo (particularly the former) comprise the bulk of the vegetation. While at times Solitaires stray out into the adjoining pastures, where there is a plentiful growth of wild Guava, their home is in the deep shady gorges. In such situations their song is a characteristic sound. It is a beautiful whistle of three or four notes with a perceptible interval between; sometimes this is followed by a succession of flute-like notes given rather rapidly, like parts of the song of the Hermit Thrush (*Hylocichla guttata*). It is not unusual to hear two Solitaires calling back and forth, each bird in its turn uttering a single, clear whistle. They also have a variation of their customary call, given as a doublet,

TYPICAL HAUNT OF THE SOLITAIRE IN MARTINIQUE.

suggesting the call-note of the Wilson's Thrush (*Hylocichla fuscescens*).

The Siffleur is not a shy bird, but often sits motionless and silent and in the uncertain light of its favorite haunts may be easily overlooked though it is rather easily "squeaked." In singing the body is held nearly erect with the tail slightly drooped, the head thrown back, and the throat dilated.

While I met with Solitaires only on the south and east slopes of Mont Pelée at elevations ranging from 800 to about 2200 feet, there is no reason to believe that they should not be found also among the gorges and ravines at equal altitudes in the rugged central portion of Martinique.

Myiadestes genibarbis sanctaeluciae Stejneger. ST. LUCIA SOLITAIRE, SIFFLEUR DE MONTAGNE

While the St. Lucia Solitaire cannot be called a common bird, nevertheless it is of not infrequent occurrence in the mountainous interior. I heard at least three individuals from the road passing near the summit of Piton Flor, and about an equal number during a half day's walk among the rugged hills lying to the eastward of the town of Soufrière. At neither station were they observed below 1500 feet. A great deal that has been already remarked under the head of the Martinique Solitaire pertains equally well to this form.

Myiadestes genibarbis sibilans Lawrence. ST. VINCENT SOLITAIRE, SOUFRIÈRE BIRD

Prior to the great eruption of 1902, the Soufrière, as the volcano on St. Vincent was (and still is) called, was wooded to its summit. A path led across the island from the windward to the leeward side, ascended almost to the summit of the Soufrière, skirted the crater rim and dropped to the other side. Fishermen from Chateaubelair and neighboring villages on the leeward side often made the journey across the mountain to Georgetown on the windward to dispose of their catch. During the month of April, many of the inhabitants made a religious pilgrimage to the summit of the mountain. As a consequence of all this passing, the wild ringing song of the Solitaire became a familiar sound to all

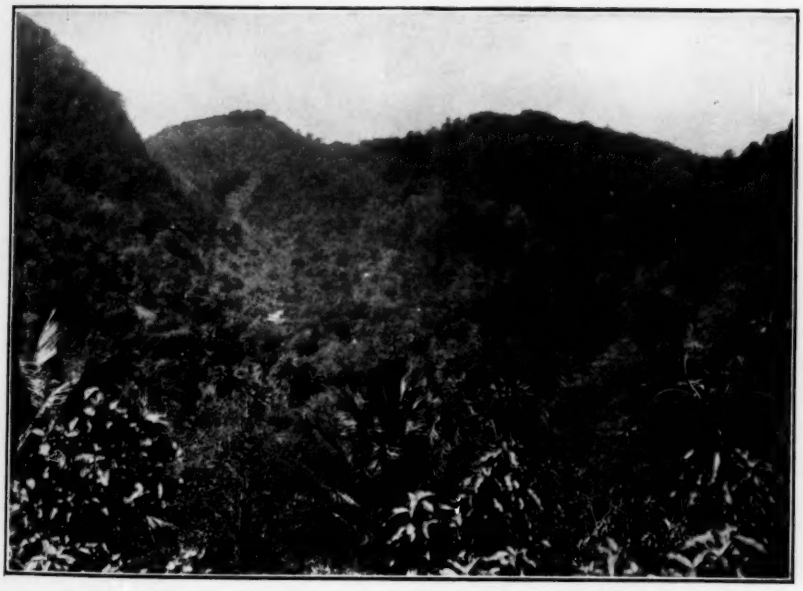
who crossed over the mountain. Furthermore, the bird being but seldom seen, an air of mystery surrounded it; as a result the "Soufrière Bird" as it was known, became familiar, through hearsay at least, over a wide portion of the island.

The terrific eruption of the Soufrière in May, 1902 devastated much of the northern part of St. Vincent. Rivers of boiling mud descended the mountain sides; blasts of incandescent gasses shrivelled all before them and showers of sand and ashes covered much of the surrounding country to a considerable depth. When once more intercourse via the summit of the Soufrière was resumed, all was changed. The mountain was a barren waste, the forest destroyed and of course the Solitaires with it, and word soon went around that the Soufrière Bird had gone.

There are however, two other ranges of mountains on St. Vincent,—the Bonhomme and the Morne Garu, that were not greatly harmed by the eruption. Of course Solitaires had always dwelt there, but since no one ever ascended these trackless mountains the birds there were never heard. Their presence however was ascertained by Lister in 1879 and Mr. G. Whitfield Smith was also aware of their occurrence, but no definite instances of capture are to be found in the literature of the first quarter of the present century.

In March 1925, Mr. Gerald H. Thayer and I climbed to the summit of the Grand Bonhomme, (2900 feet) and found three birds singing in the woods growing on the steep north slope. These we shot, but lost one in the mass of rank undergrowth and rotting vegetation. We also heard one or two others further below us but were unable to reach them from the part of the mountain on which we then were. It may be of interest to note in passing that one of our specimens, shot in the act of singing, proved on dissection to be a female.

From the observations made by Mr. Thayer and myself, I am of the opinion that *M. g. sibilans* will be found scattered sparingly on both the Morne Garu and Bonhomme Mountains above 2200 feet. Mr. Thayer told me that he expects to make a census of the Solitaires on these two ranges, and his results will prove of much interest.



UPPER: THE SOUVRIÈRE, ST. VINCENT, AS IT APPEARS TODAY.
LOWER: MOUNTAINOUS INTERIOR OF ST. VINCENT.

Myiadestes genibarbis dominicanus Stejneger. DOMINICA SOLITAIRE, MOUNTAIN WHISTLER.

There appears to be no recent information available concerning the Dominica Solitaire. Since however, Dominica is the most rugged and thinly settled of any of the Lesser Antilles and includes in its diversified topography many examples of the type of country preferred by *Myiadestes*, there is no reason to anticipate any immediate change in its status.

Museum Comp. Zool.
Cambridge, Mass.

THE ORNITHOLOGICAL COLLECTION OF THE NATURAL HISTORY MUSEUM IN STOCKHOLM.[1]

BY EINAR LÖNNBERG.

THE original nucleus of a Natural History Museum in Stockholm was formed by the Royal Academy of Sciences. In the first year of its existence in 1739, under the presidency of Linnaeus, a cabinet was provided for natural history specimens, but the preservation of birds was then very difficult and some time elapsed before any collection was obtained. Single specimens were now and then received and mentioned in the minutes of the Academy. In the year 1751, mention was made of a bird from Brazil "in beauty similar to a parrot, but it was said to belong to the eagle tribe." The collection at first contained mostly foreign birds which were presented as curiosities, and apparently a real collection of Swedish birds was not obtained before 1770. This was from northern Sweden and was said to be "well mounted." To guard birds against insects presented great difficulties at that time, and in 1784 when Sparrman was the first curator, it was advised that small birds should be put under bells of glass "since they had been mounted and arranged in their natural position," and the larger birds should be "dusted from time to time" and "be freed from moths by heat." The increase in the bird collection was probably not very rapid but donations were received from different parts of the world, including East Indies, South Africa, Brazil, West Indies, etc., and in 1791 a "Mr. Peale in America" forwarded "a box with rare mounted birds from Carolina."

For some time the bird collection of the Academy seems to have been deposited in the celebrated "Museum Carlssonianum" (described by Sparrman in a work of this name), because the owner, President G. von Carlsson, had bequeathed his collection to the Academy. After his death in 1801 difficulties arose and after some delay only a part of these collections came into the

[1] Prepared at the request of Dr. T. S. Palmer, Secretary of the American Ornithologists' Union and presented at the 43rd Stated Meeting of the Union, Nov. 11, 1925.

possession of the Academy. Evidently several birds had been destroyed by moths, because it is said that the curator had to clean them and expose them to the smoke of sulphurous acid. It is possible that the collection was reduced not a little by such unfortunate circumstances and consequently the catalogue of 1808 contains only 346 species represented by 430 specimens. At that time the curator was the botanist Olof Swartz, who appears also to have been somewhat interested in birds, as he, himself, presented some specimens to the Museum of the Academy. The bird collection was further increased by donations both of Swedish and exotic specimens, and among the latter those from South America were in the majority. An army surgeon, Frolich donated a large collection from Brazil, and minor collections from other donors were also received from the same country.

After the death of Swartz in 1818, the Academy appointed J. W. Dalman as curator. He is known as an eminent entomologist, and when the collections were placed in his care he was obliged to state, much to his regret, that again a number of birds had been destroyed by moths or other agencies. It was, of course, extremely difficult to protect birds against insects before an effective poison had been discovered. The first bird skins prepared with arsenical soap received by the Stockholm Museum were reported to have come from Brazil in 1818, where they had been collected by the German naturalist, G. W. Freyreiss. For perhaps ten years following the date just mentioned, the birds in the Museum were kept in wooden boxes faced with a pane of glass fastened with putty. Each bird was mounted in a more or less natural position on a turned wooden perch fixed crosswise on top of a similar wooden upright. The legs of the mounted specimens, as a rule, were set too far back and the eyes were often made of sealing wax or imitated by a black pearl of glass. In the museum these boxes were placed on shelves or simply piled up on each other against a wall for exhibition. Thanks to these boxes however, we have still preserved a fairly good collection of birds from the beginning of the last century and several even from the eighteenth century. Some are faded, but the majority are in a comparatively satisfactory condition, and some cannot be said to have lost their colors at all.

In the first year of Dalman's curatorship he had the good fortune to receive a large collection of birds from Brazil, presented by Consul General Westin to the Museum of the Academy. This and other important donations made the appointment of a skilled taxidermist necessary, but before it could be effected the Museum entered upon a new phase of development.

One of the members of the Academy, Baron Gustaf von Paykull had been from youth greatly interested in natural history, and although he later held an office in a government bureau which had nothing to do with this subject, he remained true to his first love. When traveling in the different countries in Europe he had had an opportunity of making the personal acquaintance of distinguished scientists of the time, and he had also visited and studied the natural history museums. His own work as a naturalist was chiefly confined to entomology and to ornithology, and he has described and named some birds, among which *Dromas* is the most interesting. On his estate, Vallox-Säby, in the province of Upland, he brought together a fairly large zoölogical collection for which he erected a special building in his garden.

In his later years, the desirability, not to say necessity, of establishing a natural history State Museum in Sweden occupied his thoughts, and to realize this plan he most generously offered to present his own very valuable collections to the State. This magnanimous offer was accepted by the King, Carl XIV Johan, with gracious benevolence. At the meeting of the Academy on the 24th of March, 1819, a royal letter was read in which it was announced that the King had accepted Baron Paykull's offer, and the Academy was requested to provide a suitable building for the natural history museum. After due investigation and preparation, the Academy replied that it was willing to grant the use of its own building for the purpose. This was also accepted, and the new State Museum was placed in charge of the Academy, which later added its own collections. The Royal Academy of Sciences was constituted a board of trustees for the State Museum, and appointed its own "intendant" or curator to take care of its collections as well as those belonging to the State. By Royal charter, the curator received the same title and rank as professors in the universities of the State.

When all the formalities had been happily arranged it remained to move Baron von Paykull's collections to the city, and this was no small task with the means of communication of that time. According to the inventory of 1819, the bird collection was kept in a house erected especially for that purpose. The windows were placed "all round under the roof, so that the walls are unbroken." The house contained three big rooms, each "15 ells broad and 10 ells long." The bird boxes (described above) were piled to a height of "4 ells, 6 to 9 inches," and the number of boxes is said to have been not less than 1,362. It was rather a large collection for that time and also contained many rarities. In June, 1820, it was reported that all the collections had been successfully transferred to Stockholm and arranged in the same manner as before in the building of the Academy. During the following years, the collection received several additions, among which perhaps the most important was a collection of birds from Java donated in 1826 by the King.

After Dalman's death, Dr. Sven Nilsson became his successor. He was a very able scientist and has made his name well known through his splendid faunal works as well as through his researches in the field of archeology in which he was a distinguished pioneer. He was appointed in 1828 and retired in 1831, when he accepted the professorship in zoölogy at the University of Lund, where he had studied and won his doctorate. His time at the State Museum was thus very short, but, nevertheless, of great importance. At the time that he entered office, the Academy had bought a large building for the Museum, in which it was housed until 1914, and since it had been remodeled for its new purpose it proved very suitable for the time. The specimens were exhibited in new cabinets and cases instead of the boxes above mentioned, and a great number of new specimens were mounted by a very able taxidermist. Nilsson was especially interested in the Scandinavian fauna, on which he has written some classical works of permanent value, and at the first opportunity he endeavored to assemble a complete collection of the vertebrates of Sweden. In this undertaking he received great help from many naturalists and sportsmen in different parts of the country. During his time, the Museum received a very valuable donation which had be-

longed to a wealthy manufacturer, Grill, and most of which had been brought together during the latter part of the eighteenth century. The birds in this collection numbered about 700, and about 50 of them were from the "Museum Carlssonianum," and thus, were partly Sparrman's types. Birds were also received from abroad, and in the records are mentioned collections from India and South America.

In May, 1831, Sven Nilsson was succeeded by Dr. Bengt Fredrik Fries, docent in anatomy at the University of Lund, who was also very able and took up his new work with great energy. In order to obtain a complete representation of the Scandinavian fauna and at the same time valuable material for exchange, he sent collectors to different parts of the peninsula, especially in the north. He also sent circulars to several persons in northern Sweden and Lapland informing them of the needs of the Museum, and in this way he obtained a considerable number of specimens. These were used for exchange with museums abroad; for example, he mentions with pride that he had received a Tragopan for a Lapp Owl (*Strix lapponica*) not to mention mammals, etc.[1] At that time, in the thirties of the 19th century, the Swedish physician and naturalist, Dr. Johan Hedenborg, made several expeditions to Syria and Egypt and later to Nubia and the Sudan and sent home large and important collections of various kinds. From the first expedition, 210 birds were received and from the second to Nubia and the Sudan no less than 777. In the year 1837, Dr. Sven Lovén made the first Swedish Arctic expedition to Spitzbergen and brought home 27 species of birds among other zoölogical collections. The Museum was also favored with many private gifts of minor collections and single specimens from aboard as well as from Sweden. Several ornithologists and sportsmen interested in faunal studies contributed liberally and regularly,

[1] Another exchange, mentioned in the records for 1835–6, was very deplorable from the present point of view. Professor Fries gave a specimen of *Alca impennis* for an *Ornithorhynchus*. Both were at that time estimated to have a value of 40 Hamburg Thaler (the same value as a specimen of *Strix lapponica*). It was of course not known that the Great Auk was then nearly exterminated. Fries believed that he would be able to obtain more specimens from Iceland, as he stated in a letter to one of his correspondents, but it was unfortunately too late. The only specimen of the Great Auk that the Museum now possesses belonged to Baron von Paykull.

thus making the series of native birds more complete and furnishing material for exchange. Unfortunately, the zealous intendant, Professor Fries, died in 1839, and the Academy elected as his successor a man well known in ornithological literature for his taxonomic and morphological works, Dr. Carl Jakob Sundevall. From the beginning he was devoted to the study of birds. Two years after his appointment in 1841, the growth of the collections of the Museum made it necessary to divide the zoölogical department into three, one of which contained all the vertebrates (as is still the case). By this arrangement, Sundevall found more opportunity to concentrate his studies on birds (and mammals) than before, when insects and lower animals were also entrusted to his care. In 1842, the collection of exotic birds was estimated to contain 5,227 specimens.

Probably the most important additions to the vertebrate collections since the establishment of the State Museum began to pour in about 1840 and following years. The Swedish naturalist, Johan August Wahlberg, famous as a South African explorer, then sent the first of his great collections from various parts of South Africa. The exact number of birds which he collected is unfortunately not known, as a considerable number of "duplicates" were sold to cover expenses and many others were used for exchange with other museums. Some of the remainder were mounted but a good many skins are still as they came from Wahlberg's hands, and it can be asserted that they are exquisite specimens of the very highest quality, as was everything prepared by him. From these collections, Sundevall was able to describe many new forms. The last collection received from Wahlberg contained 204 birds, procured in the country near Lake Ngami shortly before he was killed by an elephant. From Cape Colony, the Museum received 300 birds collected by a promising young ornithologist, Victorin, who, however, died in his youth. Many donations of varied importance included birds. A consul, Lindgren, presented 115 birds from Bahia in 1843; now and then birds were received from other gentlemen from Brazil, China, India, New Zealand; and His Majesty, the King, in 1848 donated a considerable collection of birds from Venezuela and Colombia.

In 1851, the frigate 'Eugenie' was sent out on a voyage of

circumnavigation of the globe and a naturalist was allowed to accompany the expedition. About 490 bird skins and many birds preserved in alcohol were among the results of this voyage. The most interesting were perhaps those procured at the Galapagos Islands, among which Sundevall was able to describe *Spheniscus mendiculus*. During the fifties, Consul Bartolucci presented 360 birds from the countries about the Nile; Consul Bohlsen, 138 birds from Chile; others donated birds from Brazil, Surinam and the West Indies. The several Swedish Arctic expeditions also brought home bird material. Thus, Dr. C. Y. Malmgren collected birds on Spitzbergen in 1864, and the 'Sofia' Expedition to Greenland in 1868 also made valuable collections. The taxidermist of the Museum, W. Meves, had opportunities of making repeated excursions to different parts of Sweden and he also made an expedition to northern Russia and obtained many birds from that country which was then comparatively unknown.

Exchanges with foreign museums were also frequent. From the Smithsonian Institution in Washington, 205 North American birds were obtained, from New Zealand 30, and from Mr. Kumlien some birds from Wisconsin were purchased, but otherwise North America is a rather weak point in the collection in our Museum.

Since the annual grant of the Museum had been increased a little, Sundevall was also able to buy specimens, and sometimes he added what was needed from his own purse. In this way he succeeded in bringing together a bird collection which was unusually rich for that time. He was, therefore, quite justified in saying, as he once did, in an annual report "The Bird Collection of the Museum has reached rather far in systematic completeness." Considering that the annual grant to the vertebrate department during the epoch from 1858 to 1877 was only 2,650 Swedish crowns (about $700), and with that sum everything had to be paid for (except salaries, heat, light, etc.) one cannot forbear sincerely admiring what Sundevall accomplished with such small means but with untiring zeal. It must also be borne in mind that at the same time he also brought the collection of mammals fairly up to date, and that he not only took care of the increase in the collections of the State Museum, but he also distributed much material to the universities and schools. From the present point of view,

it is perhaps almost deplorable that he was so generous in this respect, because much of that which was given to the schools was less well cared for and would have been more useful if it had been retained.[1] At that time racial and geographical variation was not considered important, and consequently it often seemed sufficient to retain a couple of specimens of each species. The others were, I am sorry to say, regarded as "duplicates" and often disposed of. Another weak point was that all specimens that were kept were mounted and thus they required considerable room and could not easily be stored. This contributed perhaps to the willingness of a curator of that time to give away "duplicates" when his cases were crowded.

Professor Sundevall retired from office with a pension in 1870, but he loved the Museum so much that he afterwards donated specimens of birds which he had bought at his own expense. He died in 1875. His successor, Dr. Fredrik Adam Smitt, docent in zoölogy at the University of Upsala, was appointed in 1871, shortly after Sundevall's retirement. Professor Smitt was chiefly interested in the study of fishes, but the bird collection of the Museum still grew during his time, especially through material from abroad brought home by expeditions to different countries. Several expeditions to the Arctic, including those of Nathorst and Kolthoff to Spitzbergen and Greenland, returned with some birds, though the marine fauna was the chief interest of the zoölogists accompanying them. The most famous of these expeditions, the voyage of the 'Vega' in search of the North East passage, collected birds along the arctic coast of northeastern Asia and also at several points on the way home. In addition to these expeditions in the Arctic Sea were also some on land, and from one of these to the Yenisei Dr. Theel brought back birds in 1876. Some years earlier, in 1872, the taxidermist of the Museum, Meves, traveled through northern Russia and Ural, where he collected birds and mammals. During three successive summers, 1876–78, Lieut. H. Sandeberg made expeditions to the Kola Peninsula and the countries bordering the White Sea. He had a taxidermist with him,

[1] Before Sundevall's time, considerable quantities of natural history specimens had been distributed to schools. For example, in 1836 no less than 408 birds were given to one school.

and these expeditions were probably the first which collected birds for the Stockholm Museum in accordance with modern ideas, as they brought together quite extensive series of the different species found in these regions.

Dr. Bovallius traveled in Central America, chiefly in Nicaragua, and made great collections of birds, which on his return were purchased for the Museum by means of an extra grant in 1886. Birds from Central America were also received from Consul General Ascoli. Some Swedish gentlemen residing for years in Argentina, Mr. Aberg, an architect, and Captain Ros, sent home specimens from that country and also from Paraguay, and Prof. Bustillos presented a collection of birds from Chile. As a member of a Swedish scientific expedition to northwestern Argentina and Bolivia in 1901–02, Mr. G. von Hofsten made a collection of birds in these countries, which was purchased for the Museum.

From Africa, birds were obtained in various ways. Collections made in Damara and Nama-land by Mr. G. de Wylder were bought through funds raised by subscription in 1876. Messrs. Knutsson and Waldau, sportsmen and pioneers in Cameroons, collected birds in this "new" country and sent them to the Museum. Several of these birds were of great interest and later were described as new by Dr. Bror Yngve Sjöstedt, from whom also some other birds from the same country were purchased in 1893. His Majesty King Oscar II, in 1894, presented a collection of birds from Borneo, and several years later the Museum acquired a collection from Java from Dr. E. Nyman. A collection of birds from Australia brought home by Dr. Fristedt was purchased in 1890. *Didunculus* and some other interesting birds from Samoa were presented by Mr. Cedercrantz when he was Chief Justice on those islands. In addition to these collections, several minor donations were received and several purchases were made which cannot be enumerated here.

Professor Smitt took no special interest in birds, and space in the old Museum was very limited. The more important acquisitions were, however, mounted and exhibited as before; some collections of skins were packed in boxes and were hardly available for scientific study. These collections were, however, not very large and there was hardly any collection of Swedish birds except the one on exhibition, which was fairly complete.

When Professor Smitt died in February, 1904, the Academy elected as his successor Dr. Einar Lönnberg, formerly docent in zoology at the University of Upsala. For several years he had the same difficulties owing to lack of space, but there was a strong movement for obtaining a new building and thus hope for better arrangements. In 1908, money was granted by Parliament for the erection of a new building for the Natural History Museum, and in 1914 the vertebrate collections could be moved gradually to their new home. The director of the department did not, however, remain idle during these years of waiting, but tried to work for the increase of the collections under his care. He perceived the necessity of establishing scientific study collections of Swedish as well as of exotic birds. On the other hand the exhibit collections could be cut down to some extent because unnecessarily large, but this could not be effected before the rearrangement in the new Museum. To begin with, it was important to try to obtain more material for scientific study and exchange. Many favorable circumstances have contributed to render these efforts successful, and the director received much help from friends and patrons of the Museum. Among the most important sources for the increase of the ornithological collections the following may be mentioned: Although the Swedish Antarctic expedition lost most of its collections when the ship was wrecked by the ice, nevertheless, the Museum received from the same source in 1904, and from other expeditions in connection with it, several birds from the western part of the Antarctic, and a few years afterwards, Mr. Sorling, taxidermist of the department, had an opportunity of collecting birds as well as other material (whale skeletons, etc.) on South Georgia. The collection of Arctic birds was increased especially by the donations of Mr. C. Bangert, a Danish gentleman, who on several occasions presented birds, including a splendid series of falcons from Greenland and Iceland. Baron Klinckowstrom also presented birds from these same countries. The collection from the Palearctic region, has as far as Europe is concerned, been improved chiefly by exchanges with foreign museums and occasional smaller purchases.

From different parts of Asia, several important collections have been obtained, thus, in 1904, one from Thian Shan; in 1906,

1908 and 1909, some from Turkestan and Northwestern Mongolia, and in 1908 a very large and representative one from Sachalin. From Japan, several minor collections were purchased. One of the Swedish officers in the Persian service, Captain R. Nicolin, who was much interested in birds, collected a great number of specimens, which he presented to the Museum. Professor J. G. Anderson, in connection with his geological and archeological researches in China during the last decade, also turned his attention to the recent fauna, and as a result the Museum received from him directly or indirectly more than 1100 birds collected in Mongolia, and in northern, western and eastern China. Recently, Mr. St. Bergman has turned over to the Museum a large and interesting collection of birds from his expedition to Kamchatka. From the Oriental region much material has also been obtained. With the valuable support of friends of the Museum, Count Nils Gyldenstolpe (assistant in the vertebrate department) was enabled to make two expeditions to Siam, which resulted in the acquisition of about 1500 specimens of birds (not counting other collections). A few years later, a friend of Count Gyldenstolpe, Mr. Eisenhofer, who had resided for a long time in Siam, presented his private collection of 1450 birds to the Museum, but as he was a German citizen the collection was sequestered by the Siamese authorities, and the Museum in 1920, had to pay a comparatively high price to redeem its own property. A few years later, a Swedish gentleman residing on the Malay peninsula, Mr. Adelborg, kindly presented a collection of 764 birds from that region.

From Australia, only one other important collection has been received, viz., from Western Australia, from the expedition of Dr. Erik Mjöberg. This collection was purchased with money granted by Parliament in 1912. Some few birds have been purchased from New Zealand, Hawaii, etc.

The greatest quantity of new material from any zoögeographical region has, however, poured in from Africa. In 1906, Professor Sjöstedt returned from an expedition to the Kilimanjaro region of East Africa and delivered to the Museum a great collection of birds, etc. Swedish missionaries procured specimens of birds in Eritrea and the Congo. In 1910–11, Professor Lönnberg, him-

self, made an expedition to Mount Kenia and the region to the north and on his return presented all his collections and among them some 900 birds. Three years later, H. R. H. Prince Wilhelm undertook a shooting expedition to British East Africa, engaged a taxidermist and donated 372 specimens of birds to the Museum. The following year, Captain E. Arrhenius, who had entered the Belgian service in the Congo, sent home about 500 birds. After the war H. R. H. Prince Wilhelm and Count Gyldenstolpe made an expedition to Central Africa to the Kivu region and inner Congo. Among the large collections obtained by this expedition were 1680 specimens of birds. Mr. A. Turner, who had accompanied the Prince on his first African expedition, added to this collection nearly 400 specimens collected in Kavirondo and adjacent districts. Still another Swedish expedition under the direction and at the expense of Capt. S. Lovén, has recently collected zoölogical material in the Elgon district in East Africa. The ornithologist of this expedition, Dr. Granvik, brought together 1333 birds for the Museum. From Madagascar, 150 specimens were received from Dr. Kaudern in return for facilities granted to him.

From North America only a little material has been acquired, and only a few hundred specimens have been obtained by exchange. The accessions from South America have, however, been more important. From Ecuador, the Museum has received through Consul L. Söderstrom about 4000 birds, not counting minor donations and purchases from other countries. Dr. K. Bäckstrom collected a representative series of birds on Juan Fernandez, and presented them to the Museum in 1919. From Cuba, about 370 specimens have been acquired through purchase.

A very valuable donation of birds was received in 1921 from Count Otto von Zedlitz. On condition that the specimens should be kept separately under the name of "Collectio Zedlitz," he deposited in the Museum all of his birds from the Palearctic region and Africa, now amounting to not less than 7481 specimens, many of great value, and collected by himself during his expeditions to Africa and other countries.

At the same time that the exotic collection increased as above mentioned, a collection of Swedish birds has been built up as well.

In doing this the director has had much assistance from a number of friends and correspondents all over the country. This collection has been drained now and then, because material for exchanges with museums abroad has been taken from it, but it comprises at present 3860 specimens for scientific use. The exhibit collection of mounted Swedish birds numbers 1710 specimens and several biological groups. The exhibition of mounted exotic birds includes about 5900 specimens, A collection of old birds containing specimens, none of which is less than one hundred years old, and many date from the end of the eighteenth century, forms a kind of "historical" exhibit which contains 855 specimens. About 1800 other old specimens have been deposited without being registered together with the scientific collection of exotic birds. The latter consists of about 30,500 specimens.

The total number of birds belonging to the Natural History State Museum of Stockholm is thus at present fully 52,100, or a little more. There are a good many type specimens, but the exact number is not known, except that those of the old collection are 28, viz., 2 from many of Sparrman's ("Museum Carlssonianum"), 2 from Paykull, etc. In the main collection are found types of species described by Sundevall, Wahlberg, Sjöstedt, Lönnberg, Gyldenstolpe, Bergman, and others. Finally, among rarities may be mentioned 1 Great Auk, 1 extinct Starling of Mauritius (*Fregilupus varius*), 3 Passenger Pigeons, and some specimens from Hawaii and New Zealand, of species which are now practically extinct.

Nat. Hist. Museum, Stockholm, Sweden.

EXPERIMENTS IN THE ECONOMIC CONTROL OF THE WESTERN CROW[1] (CORVUS BRACHYRHYNCHOS HESPERIS).

BY LEON L. GARDNER.

THE status of the Crow in its relation to agriculture has been a much discussed question, the final balancing of accounts leading, according to Kalmbach,[2] to the conclusion that the good done by this bird neutralizes the harm. There are unusual situations, however, in which the Crow may be of enormous detriment to crops, one instance of which brought to the attention of the Bureau of Biological Survey, United States Department of Agriculture, is described in the present paper.

In the region of Goodnoe Hills, Klickitat County, Washington a very promising enterprise in raising almonds and apricots was developing. It was reported, however, by the farmers of that region that in fall enormous flocks, amounting to "millions of crows," came into this region and destroyed practically the entire crop of fruit and nuts, together with considerable acreages of watermelons. These reports were partially confirmed in communications from Professor R. J. Barnett of the State College at Pullman, Washington. The Biological Survey immediately undertook to investigate the damage and to originate some method of control. For this purpose the writer was sent to the Goodnoe Hills in the summer of 1919 where, with the coöperation of Mr. L. K. Couch, the Bureau representative in that state and Mr. B. W. Cooney, the County agricultural agent, experiments were conducted that led to some interesting observations and results. These experiments have been briefly referred to in the literature[3] but are here reported in full for the first time.

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[1] Acknowledgements are due the U. S. Biological Survey for permission to use this material for publication.

[2] Kalmbach, E. R. The Crow in Its Relation to Man. Bulletin No. 621, U. S. Dept. Agr. Feb. 1918.
Kalmbach, E. R. The Crow in Its Relation to Agriculture. Farmers Bulletin No. 1102, U. S. Dept. Agr. Aug. 1920.

[3] Kalmbach, E. R. Farmers' Bulletin No. 1102 U. S. Dept. Agr. 1920 p. 18.
Kalmbach, E. R. National Geographic Magazine, Vol. 37, 1920, p. 337.

It was stated that damage commenced about the last of July among the apricots and continued through the almond season, or to early in November by which time practically the entire crop would be lost. Witnesses reported that Crows preferred almonds to other crops and that they would pull them off the trees and fly to a rookery in a deep, rocky gorge some three miles east in an air line. The statement that Crows carried the almonds away proved, fortunately, to be erroneous, for the final and successful solution of the problem was based entirely on the exact method by which the nuts were procured and consumed.

Klickitat County in which the Goodnoe Hills are located is divided into two distinct regions by the amount of rainfall received by each. The eastern half is arid with almost desert conditions, while the western portion receives an abundance of rain and is heavily forested. The county borders the Columbia River which here runs in a gorge approximately 1000 feet deep. The Goodnoe Hills are in the eastern arid section of the county. The mountains on the north (or Washington) side of the gorge rise as a steep wall in two tiers. The first ascent is about 1000 feet and quitea brupt in nature, terminating in a long level bench some 4 miles in width and paralleling the river for many miles. The second acclivity is approximately 800 feet in height rising in a more gentle slope above the first and like it forming a plateau. These elevations may be likened to the first two steps of a giant stairway.

Deep rocky gorges or canyons cut through this plateau region and these in the rainy season contain streams emptying into the Columbia. The Goodnoe Hills are located on the lower bench and are bounded by the river to the south, mountain wall to the north and gorges on the east and west. That to the east is a wide, deep and rocky canyon known as Rock Creek which is set aside as an Indian Reservation, and which served as the base from which the Crows operated.

Transportation to the Hills is difficult. A branch line, the Spokane, Portland and Seattle Railroad runs several trains a day on the north bank of the river. A two horse "stage" connects the Hills with the railroad, making one trip a day consuming from 11 in the morning until 3:30 P.M. to complete the round trip.

This region, as has been mentioned, is arid, the upper bench, with slightly more rainfall, is typical scrub oak country while the lower bench, with only about 8 inches of annual precipitation, is treeless and sage covered. The soil is exceptionally rich, with a most astonishing capacity to retain water. No irrigation is practiced, and, in spite of this, excellent and large apricots were grown as well as fancy watermelons. The land was set out to about 1000 acres of apricots and 600 acres of almonds chiefly the soft shelled varieties, and also to many large melon patches.

The Goodnoe Hills were reached August 15, 1919, by means of the County agent's automobile, from Goldendale, the stage being entirely too slow. Observations were conducted as to the prevalence of the Crows and the character and amount of damage being done.

The town consists of one building comprising post office, grocery, dry goods and hardware store, town hall and information bureau, but not serving in the capacity of a hotel. The region is sparsely settled with large orchards of apricot and almond trees, much of it owned by outside investors and cared for by the local residents. Houses were scattered over a wide area and no accomodations for living existed. In this extremity one of the inhabitants rose to the occasion and offered the use of his hay loft which was gladly accepted. However the beards of wheat that formed our beds and the abundance of flies soon impelled us to hunt for other quarters and these we found in a deserted shack two miles north, which was offered us on the condition that the watering trough for the stock be filled daily. Water is exceedingly scarce in the Hills and bathing almost a lost art as all water is used for drinking and culinary purposes. No method has as yet been provided for drawing on the waters of the Columbia scarcely four miles distant.

The residents estimated "millions" of Crows, a feeling that any grower might easily acquire on seeing the huge flocks and the havoc they wreak upon his crops. Along the entire river it was noticed that Crows were abundant but we were not prepared for the enormous numbers met at the Goodnoe Hills. The almonds were ripening fast and Crows had assembled in mass from the surrounding country for the annual feast. They were in flocks of hundreds to thousands. The usual formation was in one enormous

flock which worked as a unit in some selected orchard with a few outlying and unimportant groups feeding at random from other orchards. When in the air, this large host looked at a distance like a huge cloud of gnats.

It was difficult to estimate the exact numbers but an approximation could be made with the larger group when they settled to work in an orchard. In a 20-acre almond orchard there were about 1500 trees. To each one of these trees one could count from ten to thirty Crows with an average of fifteen to the tree. The flock on our arrival numbered perhaps 15,000 which, in a short time, nearly doubled in size until we estimated fully 30,000 members in the various groups.

There are several factors producing such large numbers of Crows, not the least of which is the abundance of safe nesting sites in all of the gorges along the Columbia River, which are little inhabited, and the nesting sites afforded by the forests of the region, are free from molestation. Rock Creek canyon forming the eastern limit of the Hills is a wide and rocky gorge that, in the rainy season, has a stream of some size. This region is rocky, forbidding and desolate with scattered cotton wood and sycamore trees affording excellent nesting sites. An immense rookery exists here from which a goodly supply of Crows issues each year. This constitutes the nucleus of the marauding flock but it gains large accessions from other regions chief of which seems to be the John Day area on the Oregon side of the river.

So completely had the Crows taken possession of the Goodnoe Hills that in the nesting of the current year many of them did not take the trouble to repair to Rock Creek but built their nests in the almond trees (none were seen in the apricots) and successfully reared their broods in open contempt of man.

Apricots were largely picked on our arrival and at that time no damage was occurring to this fruit. It was stated, however, that considerable havoc had been wrought to them. At the time of arrival the almonds were ready to pick and Crows were by far more interested in the nuts than the fruit.

With regard to the almond damage there was no argument. The destruction of an $800 crop was complete in two days after which the Crows moved on to a new orchard. It was a curious

fact that the vast majority of birds were in one flock which seemed to select one particular orchard (usually the best cultivated) where they would work continuously until the entire crop was destroyed before moving on. In this way one could find orchards in which every tree was absolutely stripped bare of nuts while in other areas trees would be heavily loaded. The ground around the trees was strewn with almond husks and shells and not a square inch of soil was to be found that did not bear countlesss Crow tracks. An idea of the extent of damage can be gained by the accompanying figures with the tree stripped bare and the nuts and hulls on the ground. The almonds most attacked were the soft or paper shelled varieties—Nonpareil, Ne Plus Ultra and especially the I.X.L. Hard shelled kinds as the Drake and Jordan are a little too hard for the Crows and are not eaten except in unusual circumstances.

The chief time of Crow damage was in the morning from 9 o'clock until noon, and again at 5 in the afternoon. Beginning at 7 A.M. Crows would begin to straggle into the Hills from Rock Creek and settle in the chosen orchard. They came in groups of twos and threes calling vociferously all the while. Gradually these increased in size until there were flocks of several hundred at a time and finally a steady stream of Crows would be pouring in from the canyon until the numbers at work in the orchards increased to enormous proportions. About noon a return flight to the canyon occurred in which the major portion of the flock would take a siesta. Around 4 P.M. these again returned to finish the days feeding.

It was a practice of the Crows, after a hot afternoon's work, to spare themselves the trouble of flying any considerable distance to water by feeding on watermelons. They were never seen to attack melons in the morning but always after a dry day's work. Furthermore green melons were sought and eaten as well as ripe ones indicating it was the moisture they were seeking. In any event the damage amounted to practically 100% of the crop, no melon being spared unless it happened to be concealed in the vines. Some of the farmers had discovered this and it was interesting to see how easily a melon could be protected in this way. The crudest attempt at concealment such as covering with a weed was

sufficient. In this way large melons were preserved when only partially concealed. Had every melon in the patch been covered, however, the result might have been different. The lack of observation on the part of the Crow in these instances seems most surprising.

In the past various attempts at control had been instituted without any success. Shooting had been tried but served merely to cause the Crows to move temporarily to adjacent orchards or keep out of range in the same orchard. Scare-crows and the exhibition of dead Crows had no effect nor did attempts to decorate trees with cloth strips serve to deter the marauders. A depressing feeling of helplessness had settled on the residents, nearly all of whom were sure that failure would result, so offered us scant help and no encouragement. Indeed one farmer sent word that we need not waste any time trying to save his crop, a statement he was shortly to retract.

It certainly must be remarked that these were the boldest Crows we had ever seen. They often flew, cawing loudly, within easy shotgun range over our heads and would remain, without fear, in the very orchard in which we were working. Once having seen the flock wreak its destruction in an orchard one was inclined to share in the disheartened feeling.

Since other measures had failed it was felt that poisoning with strychnine offered the best hope of success. A readily avialable source of bait was sought; this being found in the jackrabbits (*Lepus t. townsendii*) that swarmed in the neighboring brush and this supply was promptly requisitioned.

The Crows were found to be working in two large orchards (which may for purposes of conveniences be designated as A and B) located in the north west portion of the Hills. To reach these the flock, coming from Rock Creek, had of necessity, to cross the entire breadth of the Hills, flying over many orchards as yet untouched. The route led over our shack and we came, in time, to interpret their raucous calls as jeers of derision at our impotence.

A considerable number of rabbits were collected and taken (Aug. 17) into orchard B where the largest number of birds were at work, and at which point it was hoped to establish a central baiting ground. These mammals were cut open and left in a

heap. At the same time several rabbits were taken to another orchard (C) some distance east.

On the 18th the bait in B was inspected. On our approach a huge cloud of Crows mixed with Magpies (*Pica pica hudsonia*) and Ravens (*Corvus corax sinuatus*) was stirred up. The rabbits were totally consumed, much to our satisfaction. Those left in C were also completely picked clean, the tracks indicating it was Crow work. Accordingly more rabbits were collected and put in the same area. In the afternoon a visit was made to Rock Creek. Crows were found at their noon siesta and many old nests were located with an abundance of evidence in feathers and droppings that, for miles up and down the creek, a vast rookery existed.

Aug. 19, the bait was again visited and an immense flock of Crows found sitting around. The rabbits this time were only partially eaten, a fact that was somewhat disturbing since so large a flock should have made short work of the meat. However, more rabbits were collected and again put out.

It was now felt that enough had been done to gain the confidence of the Crows, since we had carefully refrained from shooting or premature poisoning operations, and it was decided to conduct a vigorous campaign over a large region at one time. The fact that our bait had been eaten in orchard C indicated that Crows were wandering over a large area and gave rise to the hope that sweeping operations could be conducted. It was decided to commence on the following day using everything that came to hand including the melons, on which we had had our eyes for some days. As a source of bait a neighbor had contributed an old horse and this we planned to distribute over a considerable extent of territory. It was feared that if all our bait was in one spot the first crow to be poisoned would give the alarm and thus scatter the flock whereas, in the present arrangement, a considerable killing might reasonably be expected.

On August 20, poisoning operations were commenced after due warning to all of the residents. The horse was led into orchard B, beside the heap of rabbits and there dispatched. It was then skinned and dusted with a mixture of strychnine, 1 part and saccharine, 8 parts. This was well rubbed in to the warm moist flesh. The carcass was now disarticulated and

the following distribution made. A leg was taken into the adjacent orchard (A); one leg in an orchard on the far eastern side of the hills near Rock Creek (D); two legs were located in a centrally situated orchard (E) and the carcass left in its original position. Two large melon patches were planted in almost the center of the Hills and these were well poisoned by splitting the melons, dusting with strychnine-saccharine mixture and leaving prominently exposed. Rabbits were collected and these were dusted with poison and distributed around. In the evening the horse carcass was visited and found to be drying so fast that it was sprinkled with a can of water.

Early the morning of the 21st, the bait was inspected with the following findings. Four Magpies from the carcass; from the rabbits nothing; from the melon patches twenty-one Horned Larks (*Otocoris alpestris merrilli*), seven jack rabbits and several mice. The Crows had not yet fed from our bait.

In the afternoon the Crows made a sally on the melon patches and immediately thereafter flew out with great commotion. We visited it at once and found one Crow in convulsions. A search in a nearby orchard revealed ten more Crows in distress. Of these three were already dead, one recovered and flew away on our approach and the others were in convulsions. The seven living Crows were taken to our shack where later all but three died and these practically completely recovered. Later five more Crows were found in the melon patch three of them living and these were added to our collection. The outcome with these ten Crows was as follows. Four died by nightfall, two died the next day and four made partial recoveries (one of these was complete). The wing muscles recovered better than the legs so that while they were able to fly they could not hop gracefully. The poison set up a severe gastro-enteritis that greatly debilitated them.

More rabbits were now collected and set out in an orchard in the southeast area of the Hills (F). It had been suggested that pork cracklings were good bait and these were tried. A considerable quantity was placed in the orchard (C) located in the north central region.

On walking through the orchards a Crow was surprised feeding from one of the rabbit carcasses. It flew to a fence post and within a few seconds had a convulsion which proved fatal.

August 22, the following findings were noted. Three Magpies in B (the carcass) nothing in A (one leg). In C where the pork cracklings were placed there was found one skunk (*Mephitis occidentalis notata*) and innumerable pocket mice (*Perognathus p. parvus*) that had filled their cheeks with the cracklings. In D on the eastern edge of the hills one Crow lay near a rabbit. From the two legs in E nothing was obtained. In the melon patches one Horned Lark, five jack rabbits, many mice and one immature Ring-necked Pheasant (*Phasianus torquatus*). In F (southeast) seven Magpies and one Crow.

The Crows never again entered the melon patches. The carcass, four quarters, rabbits and pork cracklings had yielded but three Crows and a few Magpies. The Crows were still at work in the almond trees in the very orchards poisoned meat was placed and it had to be reluctantly admitted that the work was practically a complete failure.

In the dry air the horse carcass dried very rapidly while the rabbits were dessicated in two days; after which they were useless. It was now noted that the flock of Crows had greatly increased in size and that almond damage was very extensive after each days' work.

From this date on no further Crows were poisoned by means of meat bait. In some mysterious manner the flock took cognizance of the changed conditions and fed no more from that source. Recognizing that this was to be the outcome and faced with failure we were forced to a serious inventory of all available possibilities.

Very careful observations were now made as to the exact tactics of the Crows and from these the successful solution was found. By remaining quietly under the trees it was observed that almonds were not picked from the limbs nor were they carried any distance, as had been reported. A number of Crows settled around each tree while several flew into the tree and walking out on a limb knocked a number of almonds to the ground by rapping sharply on the branch with the beak. Those on the ground then husked and cracked the nuts and ate them. The Crows in the tree then came to the ground and others flew up and shook off nuts. In this manner working very leisurely the entire tree was stripped.

The Crows on the ground greatly outnumbered those in the tree. It was amusing to note that the group standing around the tree moved with the sun in such a manner that they were always in the shade.

With these observations two possible lines of control suggested themselves. (1) it might be feasible to use No. 0 steel traps a considerable number of which were on hand and (2) poisoned almonds spread under the trees might be taken by the birds. It was thought also that as melons had been successfully used they might be of value when distributed through the orchards. Finally as a last resort pans of poisoned water were thought of only to be immediately rejected as being sure to kill everything. There were numerous Meadowlarks, Horned Larks, Pheasants and Grouse roaming through the orchards and we were anxious not to poison these.

Melons were therefore collected and put out in several orchards on the northeast portion of the area. A large sack of almonds was picked and poisoned with strychnine alkaloid and saccharine by splitting the nut and dusting in a small portion of the powder. These were taken to orchard A (northwest) and after leveling a place under each tree three almonds were placed in each cleared spot which then showed up very prominently. This orchard had been well stripped of nuts and most of the Crows were working elsewhere. We therefore went the rounds of the various orchards and cautiously drove the flock into the almond baited one, getting several thousand Crows there. In about half an hour there was a tremendous uproar, the flock rose out of the orchard, every Crow yelling lustily. The air was thick with Crows wheeling and turning in the greatest confusion and making away with all speed. A prompt visit to the place revealed only two Crows affected. The result was a disappointment.

We resolved to make one more attempt to use rabbits as bait and these were collected at Alderdale some sixty miles east of the Goodnoe Hills by means of poisoned melons spread through the sage brush. Some days after our visit to that place Mr. Cooney, the County agent, received a letter from a farmer in that neighborhood enthusiastically informing him that a new disease had appeared among the jack rabbits of that region, as he had found

a number stretched out dead across the road, and expressing the hope that it would exterminate them.

These carcasses were poisoned and spread in orchards in the southeast region of the Hills. A survey of results for the past two days revealed the following: In A where the almonds were left there were many mice that had gnawed into the nuts. One Meadowlark (*Sturnella neglecta*) had picked into an open nut with fatal results. Most of the nuts had dried and split open and while there were many Crow tracks around, few of the nuts had been eaten. One dead Crow was found spread out in a tree in the attitude typical of strychnine poisoning. In B, around the horse carcass, eight dead Magpies lay. There were no Crows, nor had any been in the orchard, neither did they ever enter it thereafter, nor the ten acres just adjacent. The presence of the carcass and dead Magpies served to warn them away. Magpies were easy to poison for while they joined in the almond depredations they seemed to prefer meat if it was to be had. They were not abundant in the orchards, just a few strays from Rock Creek, practically all of which we poisoned. Dead birds were removed to keep the bait effective. In C (pork cracklings) we found an ever increasing number of dead mice and one Meadowlark. In an apricot orchard directly east, two Crows were found. They had been dead several days and as on opening the stomachs no cracklings were found, it was felt that they had been poisoned from the melons in the foray of August 21. In the orchards in which melons were put out there were found only jack rabbits. The melon patches yielded no returns. Crows had not been in either patch; all melon damage had ceased and it was not considered worth while to put out more poison there.

A resumé work of the work to date was not encouraging. The almond crop in several large orchards was a complete loss. The flock of Crows had enormously increased in size and had commenced depredations in the southeast side of the Hills while a large number of Crows were hard at work in the southwest area. Meat bait was now recognized to be useless and was definitely abandoned.

On considering the results from almond poisoning it was felt that considerable improvement could be made in the method and

that the only hope lay in this direction. In the first place it was noted that any almonds that were, even slightly split open after our introduction of poison were left untouched by the Crows. This splitting it was discovered could be overcome by the use of nuts a little under ripe. By the means of a sharp knife the nuts could be slit gently and poison inserted after which they could be closed and appear as if untouched. In addition the Crows preferred choice large nuts and these we determined to use. Finally by scattering the nuts singly in the rows between trees it was possible to cover a wide area with a minimum of bait. As each almond was put on the ground the area was cleaned and leveled around with the feet so that each nut became very prominent.

One of the neighbors had attempted for years to shoot the Crows without success and had great faith in hanging up dead Crows. We however had little confidence in this as in the very melon patches treated this way Crow damage was still 100%. Indeed Crows ate melons right alongside the stake on which hung the dead bird. We therefore wasted no time in putting up stakes but turned all dead Crows over to the man who had faith.

August 25, before putting out fresh almonds, a tour of inspection showed a number of Magpies around the various meat baits. We now selected the largest and finest nuts to be found; choice large I.X.L. variety and poisoned them. These were taken to the southeast area where a large flock was at work and spread through two orchards (G and H).

August 26, early in the morning a tremendous commotion was heard from one of the freshly poisoned orchards (G). There was much cawing and chattering on the part of the Crows and a cloud of them rose straight into the air. On going over there five dead Crows were found. A visit was made to the northwest portion of the Hills where a number of Magpies were found around the horse bait and one Badger (*Taxidea taxus*) lay dead beside a rabbit it had eaten. All of the bait was much dried and from this period on none of it was effective except the horse carcass which for some time continued to give us a steady crop of Magpies.

On our return to the southeast we heard a tremendous clamoring,

above the high wind, coming from nearly a mile away and saw a huge flock rising in the air from the second orchard (H) treated with almonds there. On arrival two poisoned Crows were found.

We were busy for some hours preparing more almonds and at the end of this time revisited the orchard designated G to see if the Crows had returned. A laughable sight met us. The orchard is in a draw on one side of which we stood, as if an amphitheatre, with the almond trees below. On looking down we saw two Crows in convulsions. On the opposite side of the draw sat the flock of Crows without a sound, sitting in a wheat field, heads all turned toward the fluttering victims; a most solemn and serious conclave.

From this time on the flock was in a continuous tumult with the tide of events distinctly unfavorable to them. We poisoned large quantities of nuts and spread around a large area. An immense number of the birds settled in the southwest portion of the hills where we had not, as requested, "bothered" to work. The farmer who had sent that message now hurried over to ask for help.

August 27, the flock made a sudden foray back to the original feeding grounds A and B but were met by poisoned almonds and after losing three of their number were on the wing again. All day the flock was in a tremendous uproar. From every orchard they tried they were soon in the air cawing and calling and setting up a great clamor. The neighbors now began to pick up many dead Crows and to notify us in great glee where the loudest noise was coming from and of the antics of the flock, which was in the air most of the day carrying on a loud "pow wow" all over the Hills, not knowing where to strike.

August 28, this day was marked as was the previous one by much confusion and calling on the part of the flock. There was very little attempt to enter the orchards but most of the day the flock spent sitting disconsolately in the wheat fields. A good number of dead Crows was found so we now had plenty of material to furnish our neighbor to hang on his stakes.

August 29, this marked the last attempt of the flock to overcome the unfavorable circumstances that involved them. They descended in a huge body on a choice orchard which we had

already prepared. Within a very brief time, not more than five minutes, there was again a tremendous uproar with every bird making a desperate effort to get away as rapidly as possible and calling continuously as they went. Fifteen Crows were in convulsions and a survey of the trees showed no appreciable damage.

This marked the end of the active campaign. The Crows had now tried every portion of the Hills and had been met by poison and a consequent loss of a few of their numbers, causing the flock acute alarm. The flock now grew noticeably smaller. There were very few Crows noted in the orchards but the major portion spent their time in the wheat fields. Within a day of two the flock had dwindled to a tenth of their original number.

On September 2, an estimate was made of the total Crow population which did not exceed 2000 birds and this by the 8th had dwindled to scarcely twenty Crows. Dead birds were found in many localities, an Indian reporting the finding of a number in Rock Creek.

A survey of the bait at this time yielded many Magpies from the meat, innumerable mice from the almonds, two Meadowlarks from almonds and a considerable number of jack rabbits. One Coyote (*Canis lestes*) was found from the carcass, one house cat died from eating a Crow body and several Indian dogs had fed on the horse.

It rained a little for several days and freshened the meat bait. No visits were made to the carcass for some time. During this time the man scent became faint, Coyotes were attracted and seven more were poisoned. In communications from the County agent, word was received that later in the fall Ravens were attracted to the carcass and were killed. Since they were alleged to kill and eat young sheep the farmers were much pleased at this result.

Summary. For some years Crows had destroyed valuable almond crops in the Goodnoe Hills region of Washington. Efforts of the farmers which included shooting, use of scare-crows, belling and stringing the trees had proved unavailing. The damage not only continued, but increased to such proportions that the crop annually was a total loss and the almond growing enterprise threatened with annihilation. Melons were also pecked into and destroyed.

On investigation an enormous flock of Crows estimated at 30,000 birds was found at work in the Hills. Experiments at poisoning them with meat baits demonstrated that this was ineffectual as the Crows' predilection for almonds was too great.

The use of poisoned almonds, when properly conducted, proved successful in protecting the crops but demonstrated anew the exceptional sagacity of this bird. The first reaction was one of extreme panic at some of their number being fatally affected by their chief article of diet. This was manifested by tumultuous clamoring and confusion of the flock while sudden sallys and forays were made into distant parts of the Hills only to be met by the same fatal consequences. The flock then rapidly reacted to the changed environment by abandoning attempts at feeding from the almonds and indeed, by departing from the entire region.

Melons were treated with poison and after one experience, in which a number of Crows were killed, no futher visits were made to the melon patches.

The actual number of Crows poisoned was extremely small not exceeding 1% of the flock. The results were, however, highly satisfactory. Many orchards were rendered immune from damage and large melon patches were protected by the same means.

The flock was scattered but did not cease all depredations. A large number of Crows shifted their activities across Rock Creek, to Sundale some 10 miles east of Goodnoe Hills. At this point there were a few stunted almond orchards which were stripped of the crop through lack of efforts at protection. Large and choice watermelons are the chief agricultural product of the area and these were afforded complete immunity from the Crows by the use of poisoned melons.

Unfortunate by-products of the campaign consisted in the killing of twenty-two Horned Larks, four Meadowlarks, and one pheasant. However, this was more than counter-balanced by the destruction of a number of Ravens, and eight Coyotes.

Fort Riley, Kansas.

OBSERVATIONS ON FOSSIL BIRDS DESCRIBED FROM THE MIOCENE OF MARYLAND.[1]

BY ALEXANDER WETMORE.

AMONG the many Selachian and Cetacean fossils found in the cliffs bordering Chesapeake Bay in Calvert County, Maryland, there have been a few fragments of fossil birds, a number surprisingly small when the scrutiny to which these deposits have been subjected during the past sixty years is considered. Sometime ago the type of *Puffinus conradi* Marsh, and other avian types of similar nature from the Academy of Natural Sciences in Philadelphia, were sent to the U. S. National Museum that they might be cast in plaster. The writer took advantage of this opportunity to make a careful study of these type specimens in connection with two other fragments of recent acquisition. The results have proved of sufficient interest to warrant assembling for publication.

Puffinus sp.

The distal third of a right ulna associated with the type of *Puffinus conradi* Marsh (see Amer. Journ. Sci., ser. 2, vol. 49, March, 1870, p. 213), which Marsh considered as from a smaller individual, comes in reality from a species of shearwater of decidedly smaller size than *conradi*, probably a bird of the dimensions of the modern *Puffinus puffinus*. The specimen, therefore, indicates a second species of the genus from the Miocene of Maryland, that may not be given a specific designation until further material is available. The fossil bears the same number, Acad. Nat. Sci. Cat. No. 13,360, as the type of *P. conradi* and was collected by T. A. Conrad. It is probably the lower extremity of a "right radius" exhibited, with the type of *conradi*, by Dr. Leidy, at a meeting of the Academy of Natural Sciences on June 5, 1866.[2]

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[2] See Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 237.

[1] Published with permission of the Secretary of the Smithsonian Institution.

Puffinus conradi Marsh

Puffinus conradi, O. C. Marsh, Amer. Journ. Sci., ser. 2, vol. 49, March 1870, p. 212.

The type material upon which this species was based (Acad. Nat. Sci. Cat. No. 13,360) consisted of the distal two-fifths of a left humerus, and the distal third of a right ulna. Examination of the latter fragment shows that it belonged to another species, (see p. ——), so that the broken humerus remains as the type of the species. The specimens is marked "Miocene, Maryland, T. A. Conrad," without further indication as to its source. The bone is brownish in color, is well fossilized, and in detail may be described as follows: Shaft obliquely flattened, so that it is elliptical in outline; ectepicondylar process thin, triangular in general outline with the upper margin somewhat irregular, flattened, projecting toward the front, in appearance like the tooth of a saw, lower margin forming an abrupt angle with rest of bone, upper with a more rounded slope into shaft; height 5 mm. and breadth at base about the same, with one pit on the posterior face and two on the anterior surface for tendinal insertion; depression for brachialis inferior elliptical, deeply sunk, with steeply sloping walls and a rounded bottom, sharply delimited on all margins but especially marked on the inner side, where the bone is raised to form a broad flattened insertion for the pronator brevis; entepicondylar process slight, merging into shaft at level of lower edge of ectepicondylar process; radial condyle thin, flattened, with upper margin especially compressed, descending at nearly a right angle to base of shaft, deeply impressed on external, posterior face for the insertion of the supinator brevis and the extensor digitorum communis, separated from the base of the shaft on its anterior external margin by a distinct groove; ulnar condyle small, externally rounded, but with anterior, inner face flattened; a broad depression above its posterior face that forms an excavation in the outer, posterior surface of the radial condyle; a second excavation below its anterior face; inter-trochlear sulcus broad, open, but distinct; separated by another depression from a slight flattened ridge internal to it at the base of the entepicondylar process. The transverse diameter at the

distal end is 13.4 mm., transverse diameter of shaft at upper end 7.1 mm.

In the original description Marsh placed *conradi* in *Puffinus* through its resemblance to the black-tailed (or cinereus) shearwater *Priofinus cinereus* (Gmelin), at that time known as *Puffinus cinereus*. Careful comparison of the fossil with the modern species at hand shows that *conradi* is very similar in size and form to *Puffinus gravis* (O'Reilly),[1] from which it may be distinguished only by careful comparison. Comparison has been made with three skeletons of *P. gravis*. The shaft in the fossil is the same in size as in the modern bird but the ectepicondylar process in *conradi* is shorter and has a broader base, the radial condyle is a trifle smaller, less rounded, (more angular) without a distinct projecting hook on the upper, anterior end (present in *gravis*). The entepicondylar region in addition is less developed, and is not extended upward on the shaft beyond the level of the lower margin of the ectepicondylar process. At first glance the differences noted might be attributed merely to variation among individuals of one species but on close scrutiny the more sharply sculptured processes and graceful form of the fossil are distinctive. *Puffinus kuhlii borealis*, of slightly larger size, differs from *conradi* and *gravis* in the shallower, broader impression of the insertion of the brachialis inferior.

Puffinus conradi appears so closely allied to the modern *P. gravis* that it may be considered as a Miocene ancestor of the stock that has produced that species.

Fulmarus sp.

Among specimens collected by William Palmer is a portion of the shaft of a left humerus that comes from a species of fulmar. The bone in question is marked "S. Chesapeake Beach, Maryland, July, 1908, Wm. Palmer. From yellow stratum above." Though its assignment to this yellow stratum might indicate a more recent origin, since some of the higher zones in these deposits are Pleistocene, the bone in question, which is well fossilized, has

[1] For the purpose of this paper the genus *Puffinus* is considered in a broad sense without regard to recent proposals for its division (by Mathews and Iredale, Austr. Av. Rec., Vol. 2, 1913–1914, pp. 12, 20, 110, Ibis, 1915, pp. 582–604, and Oberholser, Auk, 1917, pp. 471–475).

the dark coloration usual to Miocene fossils from these beds and is probably from a Miocene formation. This fossil includes that part of the shaft between the nutrient foramen and the lower half of the crista superior. In size and structure it agrees perfectly with modern *Fulmarus glacialis* (Linnaeus), and must be closely allied to that species. It may be noted that in *Fulmarus* the nutrient foramen is at a higher elevation on the shaft than in *Puffinus*, a distinction that makes possible the generic allocation of Palmer's specimen. Specifically the fossil cannot be distinguished from *glacialis* on the basis of this fragmentary bone.

Moris loxostyla (Cope).

Sula loxostyla Cope, Trans. Amer. Phil. Soc., N. S., Vol. 14, December, 1870, p. 236, fig. 53. (Miocene, Calvert County, Maryland, type specimen a left coracoid.)

Sula atlantica Shufeldt, Trans. Conn. Acad. Arts Sci., Vol. 19, February, 1915, p. 62, Pl. 15, fig. 123. (Miocene, New Jersey, type specimen a left coracoid.)

The location of the type of *Sula loxostyla* Cope, a left coracoid, is not at present known so that for information regarding it we must turn to the original description and the figure accompanying it. Through the kindness of Dr. Richard S. Lull, of the Peabody Museum, Yale University, I have before me a plaster cast of the type of *Sula atlantica* Shufeldt, which I have examined in the collections at New Haven, said to have been collected by J. Leidy in the Miocene of New Jersey. In size the type of *atlantica*, which is also a left coracoid, is so similar to the dimensions ascribed to *loxostyla*, and the description written by Cope fits it so closely, that after careful review, and some hesitation, I am forced to consider the two as identical, and to cite *atlantica* in the synonymy of the present species. So similar are the two in fact that except that it is more broken at the extremities Cope's figure might well have been drawn from the Yale specimen.

In the collections of the Division of Palaeontology, U. S. National Museum, there is the distal end of a right humerus, (No. 8863) taken by Mr. N. H. Boss from the Miocene of the Calvert Cliffs in Calvert County, Maryland, in September, 1918, that I have identified as *loxostyla* from the fact that it represents a

gannet of the same size and relative proportions. In the same collections there is the upper half of the shaft of a right humerus (without the head) collected by the late William Palmer, along the shore south of Chesapeake Beach, Maryland, where it had probably been washed from the same deposits that seems also to belong to the present species.

Though the species that comprise the family Sulidae have long been considered congeneric, the naked throat and scutal covering of the toes in the gannets, first pointed out by Mathews,[1] are external structural characters that easily warrant their generic separation from the boobies (genus *Sula*). As shown by Oberholser[2] the correct name for the Gannets is *Moris* of Leach, 1816[3] since this is not preoccupied by the previous *Morus* Vieillot[4] 1816, or *Morum* Bolten, 1798. Though Leach, in his list published some time after August 30, 1816 (the date of the preface), in all pobability intended to use *Morus* Vieillot, a name proposed in April of that year, his emendation, if such it is, must be accepted as valid and so must be used in place of *Sulita* erected by Mathews for this group.

External differences between *Moris* and *Sula* are reflected to more or less degree in the skeleton. In the coracoid the lower anterior face is broad and plane toward the inner side in *Moris*, while it is narrower and more rounded in *Sula*. On this criterion *loxostyla*, belongs in the genus *Moris*. The distal end of the humerus also presents characters of difference between the two genera, as in *Moris* the radial condyle is relatively slender and elongated, with a pronounced excavation on the inner side on the upper, anterior end so that it appears flexed at this point. In addition the articular surface for the pronator muscles is plane and considerably elongated. In *Sula* the radial condyle is broader, shorter, and rounder, without a pronounced inward flexure of the upper end, while the prominence for the insertion of the pronator is short and irregular. In the points mentioned the National Museum specimen agrees with *Moris*. Following is a description of the lower end of the humerus in this bone.

[1] Austr. Av. Rec., Vol. 2, Oct. 23, 1913, p. 55.
[2] Auk, 1919, p. 417.
[3] Syst. Cat. Spec. Indig. Mamm. and Birds Brit. Mus., 1816, p. 35.
[4] Anal. Nouv. Meth. Orn. Elem., April, 1816, p. 63.

Shaft flattened on anterior face, impressed by broad area for the brachialis inferior, which is deepened on its inner side and shallow on the outer portion, bordered externally by a low, narrow, raised margin, and internally by an abrupt plate, that slopes up to merge in the pronator tubercle; internal face of lower end of shaft flattened, with a sharp rectangular union with both anterior and posterior planes of the bone; posterior face, gently curved for inner half, and then sloped in a flat surface that merges with the outer edge of the anterior face in a sharp, acute angle; pronator tubercle long and narrow (approximately 8.5 mm. in length) with the anterior end elevated, so that, viewed from the external side, it presents in outline a flattened isosceles triangle, with the upper end as the apex, which slopes away in a faintly concave line to right and left; ulnar tubercle relatively small, strongly protrudent anteriorly, irregularly globular, excavated under upper side so that it has a slight overhang above impression for the brachialis inferior, with a large, broad, olecranal depression behind; radial condyle compressed, elevated, curved inward at upper end, where the outer side is undercut, the upper margin of the process standing out boldly above the shaft, with its walls rising at a sharp angle from the base; sulcus anconei lateralis a deeply impressed U-shaped groove, cutting posterior face of radial condyle; sulcus anconei medius broad and shallow, well marked immediately above olecranal depression, disappearing beyond.

Pertinent measurements of this bone are as follows;

Breadth of bone across condyles 21.1 mm., transverse breadth of shaft at level of upper third of brachial depression 13.5 mm., vertical diameter of ulnar condyle 7.0 mm., vertical length of radial condyle 10.2 mm.

In the broken shaft collected by Palmer the line for the insertion of the deltoid is strong, and extends from its proximal end downward, without a break, verging constantly toward the center, to end just external to the median line of the bone. The upper portion of the internal, posterior face is plane. Proportionately the shaft seems somewhat more slender than in *Moris bassana.* It is possible that the fragment described may have formed part of the shaft of the bone secured by Mr. Boss, though they do not articulate as a small portion of bone that should form the necessary junction is missing.

The form of the condyles, the length of the attachment on the promator tubercle, the relative position of ulnar and radial condyles with the form of the deltoid crest and the posterior face of the shaft, indicate the affinity of the present fragments with *Moris* and not with *Sula*.

In modern seas we find three species of gannets, *Moris bassana* (Linnaeus) of North Atlantic waters, *Moris serrator* (Gray) from Australia and New Zealand, and *Moris capensis* (Lichtenstein) from southern Africa. All are maritime species that breed near the seashore or on rocky islands and seek their food from the sea.

In the U. S. National Museum there is a good series of skeletons of *Moris bassana* and one of *Moris serrator*. *Morris capensis* from one skin that I have examined, loaned for the purpose by the American Museum of Natural History, and from published descriptions, is similar in size to *M. serrator*, from which it is distinguished by the entirely dark tail; in *serrator* the median rectrices alone are black, or brown.

The two gannets of the southern hemisphere are slightly smaller than *M. bassana*. The fossil form, *Moris loxostyla*, appears less in size than the two smaller, modern birds so that the four fall into three groups as regards their dimensions. The relative proportions of the four is indicated by the measurement of the transverse intercondylar diameter of the humerus. In eight specimens of *Moris bassana* this ranges from 23.7 to 24.3 mm., in one skeleton of *M. serrator* it is 22.5 mm., in one *M. capensis* (measured in the skin) 24.5 mm., while in *M. loxostyla* it is 21.0 mm.

Other sulids thus far described cause no confusion in the determination of *loxostyla*. *Sula arvernensis* Milne-Edwards,[1] from the Upper Oligocene of Gannat, France, based on a fossil pelvis, is larger than the modern gannet (*Moris bassana*), as is *Sula ronzoni* (Gervais),[2] said to come from the Oligocene of Ronzon, near Puy-en-Velay, France. *Sula pygmaea* Milne-Edwards[3] from the lower Miocene of France is smaller.

U. S. National Museum,
Washington, D. C.

[1] Rech. Anat. Pal. Ois. Foss. France, vol. I, 1867, p. 267, pl. 42, fig. 13, pl. 43, fig. 12.

[2] *Mergus ronzoni* Gervais, Mem. Acad. Sci. Montpellier, vol. I, 1851, p. 220, cf. Milne-Edwards, Rech. Anat. Pal. Ois. Foss. France, vol. I, 1867, p. 271, pl. 44, fig. 9.

[3] Bibl. Ec. Haut. Etudes. Sci. Nat. vol. 11, 1874, p. 8, pl. 2, fig. 2.

AN UNUSUAL FLIGHT OF ARCTIC THREE-TOED WOODPECKERS.

JOSSELYN VAN TYNE.

IN October, 1923, a remarkable flight of Arctic Three-toed Woodpeckers (*Picoides arcticus*) invaded New England and extended as far south as New York City. At the suggestion of Dr. G. M. Allen I have attempted to gather the scattered records and to find, if possible, something of the cause of the flight.

The records of the Nuttall Ornithological Club have been the source of the largest number of these reports. Second only to these are the records generously furnished me by Mr. E. H. Forbush from his capacious files. I am also much indebted to the numerous isolated observers who have answered my many letters and whose names will be found with their respective records.

Before detailing the records of this abnormal invasion I shall summarize very briefly the normal status of the bird on the Northeast.

Maine—Uncommon winter visitor; rare resident in the northern and western counties.

New Hampshire.—Rare resident above 3,000 feet in the White Mountains. Elsewhere a rare visitor.

Vermont.—Rare resident in the north and in the high peaks; occasional winter visitor to the lowlands.

Massachusetts.—Occasional fall and winter visitor.

Connecticut.—Two previous records (winter).

New York City Region.—Two Long Island records in the winter of 1886–87.

New Jersey.—No previous records.

That these Woodpeckers normally do not move southward in winter is shown by the fact that this is the first flight of such proportions that has occured since there have been enough observers in the Northeast to note its occurrence. Perhaps the last such flight was in 1860–61 when Brewster (Bull. Nuttall Ornith. Club, Vol. 8, p. 121) records that George O. Welch found this

Woodpecker "actually abundant" at Lynn (Mass.) where they "remained through the entire winter."[1]

The records have been sifted carefully and only those about which there seemed to be no possible uncertainty are given here. All of the dates of occurrence in this paper are for the autumn of 1923, and the spring of 1924.

MAINE—Eliot.—Arthur H. Howell writes that he saw one on October 7.

Machias.—F. M. Kilburn found the Arctic Three-toed Woodpecker common during the first half of October and saw several during November.

Portland.—Dr. Ada O. Fogg saw one on Peaks' Island, October 3 and 4.

Waterville.—Dr. Edward H. Perkins reports a female seen there from April 1 to 28.

ONTARIO—Kingston.—Edwin Beaupré records three seen at Kingston on October 11 and adds "this is more than I have previously seen at one time."

NEW HAMPSHIRE—Randolph.—Three were reported here on February 11 by J. E. Norton Shaw of New Bedford, Mass.

VERMONT—Wells River.—The only record available from the State is that of one seen by Wendell P. Smith on October 5. His last date for the winter is February 15. This lack of records from Vermont and New Hampshire is probably explainable to a considerable extent by the paucity of observers in the region.

MASSACHUSETTS—Arlington.—On the afternoon of October 27 Norman W. Hall collected a male in good plumage and later mounted the bird. This specimen was also seen by Ralph Lawson.

Ashburnham.—R. W. Merrick of Gardner reports one studied on May 23 as it worked on a dead tree.

Belmont.—The first bird of this flight recorded in Massachusetts seems to be one seen here on October 6 by P. J. Darlington, Jr. On October 16 he also saw a male near the same place. Samuel D. Robbins found a female "in a large dead white pine" in Belmont on April 21.

Boston.—At Jamaica Pond Francis H. Allen and Charles B. Floyd saw a male on November 9. One was seen here again on November 18 (F. H. A.) Dr. A. L. Reagh found a female "working among the white pines" at Stony Brook Reservation on October 22.

East Lexington.—Professor F. A. Saunders saw one here on October 27.

Harvard.—James L. Peters collected a male in Harvard on October 27.

Holyoke.—Arctic Three-toed Woodpecker was discovered by Aaron C. Bagg on March 24 "drilling in a dead white pine."

Hudson.—At Boone's Pond, Hilda N. Olson found one on October 28 "busy on a dead pine."

[1] Of especial interest here is the report of a flight of these birds in the same region in the autumn of 1925 (Bird Lore, 28, pp. 55, 56).

Lynnfield.—Ralph Lawson, S. G. Emilio, and others observed one October 20 and for several days afterwards.

Medfield.—Manley B. Townsend reports one " picked up on the ground during a heavy rainstorm " on October 24.

Medford.—E. A. Brooks saw one November 3 and 5 at Spot Pond.

Nantucket.—The only one ever recorded on the island appears to be a female seen there October 21 by John A. Farley.

Newton Centre.—The greatest concentration of these Woodpeckers recorded at any one point was on the estate of Mr. F. H. Kennard where scores of dead and dying white pine afforded an abundance of their special food. The first one seen was a male collected on October 17. Another individual appeared by October 20 and during the winter at least three males and two females were accounted for, while all indications point toward the actual presence of perhaps twice as many. The most remarkable fact about this group of birds, however, was the length of their stay, for both males and females were seen as late as the middle of May and at least one male stayed through the early part of June and was last seen on June 12.

Newtonville.—Dr. John Brainerd found a male and a female here on April 6.

Northfield.—A female was seen on November 13 by Professor R. T. Fisher of the Harvard Forestry School.

Petersham.—Dr. Charles W. Townsend found a male " on a dead pine " on May 20.

Southampton.—Bessie M. Graves reported two in a census taken December 26 for 'Bird-Lore'. At the same place A. A. Cross of Huntington, Mass., saw one as late as March 9 " at work on dead pines."

Southwick.—Aaron C. Bagg reports a female seen May 25 on Provin Mountain by " three reliable observers."

Taunton.—A male appeared October 21 and was seen daily for several weeks by A. C. Bent and F. S. Hersey.

West Roxbury.—Francis H. Allen saw a female on March 23.

Winchester.—Grace M. Snow and Charles E. Clarke observed a female here January 13 and February 17.

CONNECTICUT—Branford.—Edward H. Armstrong reports a pair seen October 23 and for some time thereafter; also a female seen October 25 and a male taken " at Pawson Park October 27 and now in my collection."

South Windsor.—C. W. Vibert saw a female on January 2 and kept it under observation until February 22 when he collected it and sent it to John H. Sage in Portland.

Wethersfield.—A female was seen here on October 8 by Benjamin Adams and later by D. B. Hoffman.

NEW YORK—New York City.—J. and R. Kuerzi report a female at Bronx Park on October 14 and a male October 18 to 20 (Bird-Lore, 26, p. 181).

Rochester.—Oscar F. Schaefer records in 'The Auk' (41, p. 351) a male seen October 20 and a dead bird found nearby on October 24 and considers these the first county records for the species.

NEW JERSEY—Englewood.—The unusual character of this flight is emphasized by the fact that it provided the first State record for New Jersey. This bird, a male, was found and collected by Ludlow Griscom on November 29 on the old Phelps estate ('Auk' 41, p. 343).

An examination of these records makes it evident that we have here a case of concerted migration in a species normally non-migratory. Some search for the causes of this flight seems justified by the amount of evidence at hand.

One fact that must be taken into account here is that the birds came south first in a distinct wave, not merely straggling southward as winter came on. This main wave probably reached Massachusetts, October 18 or 19, or perhaps even as early as October 16 (Belmont—P. J. D.) and was discovered when the observers took their week-end walks. For the massing of records on October 20 to 21 and 27 to 28 cannot be assumed to mean more than that bird students must toil on week days like ordinary mortals. Also it is to be noted that this first wave carried the maximum distance and by October 21, the Woodpeckers were seen on Nantucket and in New York City.

The first and most obvious cause which has been adduced in explanation of such flights is the oft repeated one of a "hard winter." The fact that this explanation is customarily overworked need be no bar to its validity, but this flight came in October of an autumn decidedly warmer than the average (cf. Monthly Weather Review).

The opposite of this has, rather oddly, been proposed. Aaron C. Bagg in a letter repeats the suggestion he had previously published (Auk 36, p. 421) that an open winter has some connection with the southward movement of this and other Woodpeckers. But he admits that he can conceive of no reason for this.

That the previous summer had been one of unusual drouth in eastern Canada, seemed important at first, but W. L. McAtee points out in a letter that "these birds feed very largely upon wood-boring larvae most of which spend more than one season in the larval stage and which would not likely be affected by any drouth in the North."

J. T. Nichols has discussed this problem of irregular migration in connection with a brief consideration of the origin of bird migration (Science, 48, p. 168). The occasional flights of such species he terms "centrifugal" migrations and says "the centrifugal condition is the original one with the species in a state of unstable abundance." During such a period of unusual abundance, the species overflows into adjoining territory in a futile and wasteful attempt to expand its range. Through the elimination of these stragglers the species, he suggests, evolves to the condition of an adjusted, permanent resident species. What the cause of such periods of abundance may be, he does not mention.

In the present case, such an abundance of the species in eastern Canada previous to the flight is indeed indicated, though not well proven, by the reports available from the region. It is probably true that the Arctic Three-toed Woodpeckers belongs in Nichols' first category, though we might suggest that it has evolved well on toward the second condition. If, then, we accept this tentatively as the most plausible explanation, there arises in turn the question of why the species should have reached a point of such unusual abundance. What may well have been the most important cause has been put forward by J. M. Swaine, Associate Dominion Entomologist at Ottawa. In answer to a request for information he has sent an account of conditions in eastern Canada. Since these Woodpeckers live on a rather specialized diet of coleopterous and other wood-boring larvae which flourish only in recently killed timber the following summary of his account is of especial importance.

Between the years 1909 and 1914 an outbreak of the Spruce Budworm developed over the whole of Eastern Canada and included the greater part of the state of Maine. The actual feeding of the caterpillars died away in the Province of Quebec, gradually, so that they had disappeared from practically all parts excepting the extreme west by 1916. In New Brunswick the feeding had ceased by 1922. As a result of the feeding perhaps three-fourths of the balsam in the southern part of the Province of Quebec has been killed and at least the same proportion in New Brunswick and Maine.

In New Brunswick and in Maine, in addition to the balsam, a

very large amount of red spruce has been killed. Much of this particularly the balsam, died within a year or two after the outbreak of caterpillars commenced, but a very large part of the timber has continued to die, down even to the present time (1924), although, probably the greater part of the mortality is past. "In these dying balsams and spruce," he writes, "insects such an Monochamus scutellatus and Monochamus marmorator, Pissodes dubius, Pissodes affinis and many bark-beetles bred in almost inconceivable abundance, so that for a long period of years" the Woodpeckers "would have had an almost inexhaustable supply of the very best food and apparently must have had ideal conditions for breeding to great numbers. I am quite sure that Woodpeckers have been more abundant in our eastern woods in recent years, but can give no definite figures."

It would surely be fallacious to suppose this to be the only cause, but from the evidence presented above it seems extremely probable that it was indeed an important cause of this almost unprecedented movement of the Arctic Three-toed Woodpeckers. What the other factors may have been, I can not at present surmise, but I present this discussion with the hope that it may be of use in the study of similar problems.

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GEOGRAPHIC VARIATION IN SPIZELLA ATROGULARIS.

BY JOSEPH GRINNELL AND HARRY S. SWARTH.

THAT the Black-chinned Sparrow of southern California and Lower California differs in some measurements from specimens of this species from the Mexican plateau has been pointed out by Ridgway (Birds N. and Mid. Am., part I, 1901, p. 323, footnote). Coues (Proc. Acad. Nat. Sci. Phila., 1866, p. 87) had previously suggested the possibility that birds from these two regions represent two distinct forms; but his idea was based upon certain plumage variations which are, as it turns out, seasonal, and not peculiar to birds from either section.

With the assistance of Dr. Louis B. Bishop and Mr. J. Eugene Law, supplementing the resources of the Museum of Vertebrate Zoölogy, specimens in fair sufficiency are available to us from Arizona, and these differ from southern California birds just as do the Mexican ones, judging from the measurements given by Ridgway (*loc. cit.*). There are evidently two recognizable forms of the Black-chinned Sparrow, one occurring on the Mexican plateau and northward into central Arizona, the other in southern and Lower California. The Arizona birds appear to be of larger size, though in measurements this size difference is definitely reflected only in the longer tail. The wing and tail feathers are so markedly affected by wear in this species that it is essential that comparisons be made between specimens taken at the same season. Furthermore, in the Arizona subspecies the lower parts are of a clearer gray. In the California birds the breast has a slight, but appreciable, brownish cast.

In Lower California the Black-chinned Sparrow occurs probably as a summer visitant in the mountains in the northern part of the peninsula, and as a winter visitant in the Cape San Lucas region. Birds from both sections prove to be the same as those from southern Upper California. Now as to names for the two races:

Spinites atrogularis Cabanis (Mus. Hein., i, April, 1851, p. 133, footnote) was described from "Mexico." The name *Struthus atrimentalis* Couch (Proc. Acad. Nat. Sci. Phila., VII, April, 1854,

p. 67), applied to a specimen from Agua Nueva, Coahuila, Mexico, may be passed as a synonym of *atrogularis*. *Spizella evura* Coues (Proc. Acad. Nat. Scl. Phila., 1866, p. 87, in synonymy), applied to the young plumage, from Fort Whipple, Arizona, and a name of peculiar standing (see Ridgway, *loc. cit.*), may also be ignored in this connection. We do find a name, however, that appears to be available for the Pacific coast subspecies of *Spizella atrogularis*.

Coues (*loc. cit.*) in his account of the species says: "Several specimens from Cape St. Lucas, in precisely the plumage of my autumnal Whipple examples, I find labelled by Baird with the MSS. name '*S. cana*, n. s.' " This seems to be the first place in which the name *cana* appears in print. Baird's type specimen, no. 23867, collection of the United States National Museum, is, through the courtesy of Dr. C. W. Richmond, available to us for examination. It is labelled as collected by John Xantus (original number 6022) in the Sierra San Gertrude, Lower California, January, 1861. There is some uncertainty as to the date and exact locality, as Dr. Richmond advises us that in Xantus' original field catalogue, no. 6022 is entered as a "Peucaea," from Cape San Lucas, October 15, 1860. However that may be, we have here a specimen of Black-chinned Sparrow from the Cape region of Lower California, definitely designated as a type and with a name affixed. This bird, together with others from that region, is exactly like southern California birds in appearance. In fact, it seems likely that at least some of the birds breeding in southern California spend the winter in southern Lower California. The name *cana*, though originating with Baird, must be accredited to Coues, since the latter was the first author actually to publish the name.

Our conclusions are that there are two recognizable forms of the Black-chinned Sparrow, with names and diagnoses as follows:

Spizella atrogularis atrogularis (Cabanis). MEXICAN BLACK-CHINNED SPARROW.

S[pinites]. atrogularis Cabanis, Mus. Hein., i, April, 1851, p. 133, footnote.

Type locality.—" Mexico."

Range.—From west-central Arizona, as far north as the Hualpai Mountains and Fort Whipple southward over the Mexican plateau. A single

Spizella atrogularis atrogularis

				Wing[5]	Tail	Culmen	Depth of bill	Tarsus	Middle toe without claw
36938[1]	♂	Chiricahua Mts., Ariz.	Dec. 6, 1923	66.0	75.0	9.0	6.0	20.0	13.2
27744[2]	♂	Sierra Ancha, Ariz.	June 20, 1917	62.0	69.2	9.2	6.2	20.0	12.5
13200[2]	♂	Colorado R., Calif., opp. The Needles	Mar. 3, 1910	62.0	——	9.0	6.2	19.0	12.2
6982[3]	♂	Chiricahua Mts., Ariz.	June 24, 1921	61.0	68.0	9.0	6.0	19.0	12.2
36939[1]	♀	Chiricahua Mts., Ariz.	Nov. 6, 1923	62.0	72.5	8.8	6.0	20.0	12.5
6983[3]	♀	Chiricahua Mts., Ariz.	June 24, 1921	58.0	67.0	9.0	6.0	——	12.0
		Spizella atrogularis cana							
4300[4]	♂	San Jose, Lower Calif.	May 5, 1925	62.0	65.0	8.8	5.2	18.5	10.2
36661[1]	♂	El Valle, Lower Calif.	Jan. 28, 1924	58.0	62.0	8.2	6.0	17.0	10.2
36660[1]	♂	El Valle, Lower Calif.	Jan. 22, 1924	61.0	66.0	8.2	5.8	18.5	11.5

Measurements in millimeters (average, minimum and maximum) of *Spizella atrogularis cana* from southern California; 10 males

Wing	Tail	Culmen	Depth of bill	Tarsus	Middle toe without claw
62.6 (60.0–64.5)	66.7 (64.0–70.0)	8.7 (8.2–9.0)	5.7 (5.5–6.0)	18.0 (17.5–19.0)	11.8 (11.0–12.5)

[1] Coll. L. B. Bishop.
[2] Coll. Mus. Vert. Zool.
[3] Coll. J. E. Law.
[4] C. Lamb, field number.
[5] Measurements in millimeters.

specimen taken on the west side of the Colorado River opposite The Needles, March 3, 1910 (Mus. Vert. Zool. no. 13200), brings this subspecies into the avifauna of California.

Characters.—Slightly larger, with notably longer tail (see accompanying table). Under parts, of a clearer, more slaty tone of gray.

Spizella atrogularis cana Coues. CALIFORNIA BLACK-CHINNED SPARROW.

S[pizella]. cana Coues, Proc. Acad. Nat. Sci. Phila., 1866, p. 88, in text ("Cape St. Lucas," Lower California; ex Baird MS).

Type.—Male; no. 23867, United States National Museum; Sierra San Gertrude, Cape San Lucas region, Lower California, Mexico; January, 1861; collected by John Xantus; original no. 6022.

Range.—From central California, as far north as Independence Creek, Inyo County, Coulterville, Mariposa County, and eastern Alameda County, southward over southern California to the southern end of the Lower Californian peninsula.

Characters.—Smaller, with decidedly shorter tail. Gray of under parts with an appreciable brownish cast.

We are under obligations to Dr. Chas. W. Richmond, Associate Curator, U. S. National Museum, not only for the loan of the type specimen of *Spizella cana*, but for an expression of his authoritative opinion as to the application of the several names that have been based upon specimens of *Spizella atrogularis*.

Museum of Vertebrate Zoölogy, University of California,
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USEFULNESS OF OUR SONG BIRDS THROUGH SOIL AND VEGETATION.

E. A. ANDREWS.

THAT our song birds destroy insects and weeds and thus often aid us in the rearing of food supplies has been so often emphasized that it seems quite unusual for the emphasis to be placed not upon this utility but upon the esthetic benefits to be got from preservation of our feathered friends as has recently been done in the excellent 'Bulletin' of the Board of Game Commissioners of Pennsylvania where we read: "Are we never to realize and admit that our most sincere reason for protecting birds is simply that we want them as they are about us, whether they are each saving our state so many cents apiece annually or not?"

Granting this, it may not yet be amiss to call attention to a possible usefulness of our song birds that has not been stressed, namely, their aid in the supply of food for plants, plants in general, which though like insects are not all directly beneficial to man, yet unlike insects are fundamental constructors of what all animal life needs.

Those who keep Canaries know full well the amount of cleaning needed to remove the waste left in the cage; those who keep poultry profit by the labor spent in collecting the droppings from under the perches; those who farm know the cost of guano brought hundreds of miles. That all birds pass out materials useless to themselves but capable of being used by plants is too well known to need comment, yet few may have associated song birds with the making of such useful by-products.

All winter long and through the spring a male Redbird or Cardinal choosing to sleep under the shelter of a porch made his roosting place obvious from the white droppings collected on the floor beneath. In the last three months these had amounted to 70 cc. of dry crumbly material which would have been less bulky if pulverized. This mass weighed thirty-one thirty seconds of an ounce. The dejecta from one night, May 13–14, weighed when dry 120 mg. While these are but small amounts it is to be noted

that they represent only the products left in the night and the deposits during the whole twenty-four hours the year through would be very much greater. Even an ounce in 3 months of night collecting would be ¼ lb. a year.

The census of small birds nesting in the North and East parts of the U. S. made by the Department of Agriculture indicates about one pair of birds to the acre in farm land; however, in suburban regions where efforts are made to encourage birds the numbers may rise, especially in Maryland, to twenty-seven or even forty birds per acre.

Assuming the above observations as a conservative basis, one pair of birds might well supply ½ pound of enrichment to the soil per year, while thirty birds should supply 15 pounds per acre.

Yet most of the song birds are migrants and many will be absent and not represented during the winter, so that the above amounts of possible betterment to the soil will be less in any one locality. But, even if the acre receive only ½ lb a year on the farm and 15 on the best suburban haunt of song birds, that will amount to something in a hundred years. Consider the guano beds of Chile, where the sea fowl have been "*laying down treasure and stench for years untold.*" The bats also that forage for insects and do not scatter their wastes but concentrate them largely in their sleeping abodes, show plainly the effects of numbers, for little by little they accumulate tons of guano. Vernon Baily in the September 'Geographic Magazine' gives measurements of droopings in 44 hours from bats in the Carlsbad Caverns and reckons that they would in a thousand years deposit a mass fifty feet in thickness while caves further south inhabited the year through may yield sixty tons of insect remains and excreta of bats every year.

The song bird must help in the return to the soil of plant food; taken away by seeds and depredations made by insects and later transformed by the bird into possible betterment of the soil.

Unfortunately, nothing seems to be known of the value of the droppings of our small birds and we may only surmise that since they evidently contain much uric acid, that, in general, they may be comparable in manurial value to the guano of insect-eating bats or of sea bird origin, or to the manure of Fowls, Geese,

Ducks and Pigeons which have been studied. It is the collections of large masses of these materials in certain places that has led to their utilization; but even the scattered droppings of little birds are not all wasted.

From Bailey's 'Encyclopedia of Agriculture,' we gather that the large birds in domestication rival the big domesticated animals in their usefulness as suppliers of plant food. Theoretically, the little birds should do the same in proportion to their size; and their small size in some cases in counterbalanced by their great numbers.

Physiologically, it is of great moment that some remarkable process in birds makes the water that dissolves the nitrogenous waste stay behind in the body of the bird and not be wasted as liquid urine as it is in common animals; hence the nitrogen waste is very concentrated when it comes to the soil and the wide scattering by small birds gives chance for applications of concentrated fertilizer to chance plants here and there.

If it could be proved that the growth of the trees and weeds along fence rows is sometimes due to chance sowing of seed dropped by birds when perched along the fence, it might also be shown that the various plants along the fence were manured by the bird's droppings, there more than elsewhere, and this might be a contributing element to the success or failure of one plant rather than another.

As a fowl is said to produce 30–45 pounds of excreta a year, it may well be that the Redbird or other song bird will be found on study to produce much more than the above reckoned ¼ pound per year. Evidently there is room for observation and experiment to base conclusions upon.

As the amount of waste in animals is somewhat proportional to the weight of the animal or bird. it would be interesting to compare the song birds with poultry as to weight and thence surmise the excreting value of the small bird; in lack of direct measurements. However, the weight of the song bird is not a feature recorded by the ornithologist, to any extent. To find the weight of a Cardinal bird we must either shoot one or look for information in unusual publications sought out by the kindness of the leaders of the U. S. Biological Survey.

One German author[1] states the following as the weights of our Cardinal; in a list of some 436 birds weighed and compared with the weights of their eggs; the Cardinal, number 423 in the list, had a weight of 40 grams while its egg weighed 4.5 or 11% or one-ninth of the body weight. The number of eggs in a clutch being 3–5 the nest full weighed ¾ or 44% of the body weight.

Other birds weighed: Sparrow 30 g., Crow 1300 g., Woodpecker 20 g., Hummingbird 2 g., Stork 5000 g., Hen 1500 g., and the Starling 77 g. Very many of the smaller song birds weighed each less than 100 g.

Another author[2] for comparison states the weight of the Starling as 92 g. and 75 g. for males from different localities and the female as 83 g.; while he gives for the Sparrow weights of 27½ for the male and 30 g. for the female.

If then a hen, stated to weigh 1500 grams, yields 30–45 pounds of fertilizer a year, a Cardinal weighing 40 grams might yield easily a full pound, so that the above reckoning of a quarter of a pound per annum per bird may well be far too small, even if we doubt that a Cardinal could yield ten times its weight of excreta in a year, as may the domesticated fowl.

And as the Cardinal is but one of many song birds, some larger than it and many smaller, the whole series of birds from the Hummingbird up, will, from their numbers, necessarily yield large amounts of waste products. These wastes being widely scattered and not concentrated in guano deposits escape notice, but theoretically they have still much value to vegetation; how much value remains to be found out by exact observations and experiments in the future.

If in garden practice, 500 pounds of sodium nitrate be applied per acre, this, of course, makes the aid of little birds seem very trifling; however, the like amount of hen manure might serve as well and if one adult fowl yields 30–45 pounds a year, a dozen fowls might fertilize the acre. A few small birds to the acre should be of some value in proportion to their weight, unless they may prove to be very inferior to fowls in proportion to size.

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[1] Heinroth, O. Die Beziehungen zwischen Vogelgewicht, Eigewicht, Gelegengewicht und Brutdauer. Ornithologische Monats-berichte 32, 1915, pp. 172–285.

[2] Krohn, H. Vogelgewichte. Ornithologische Monatsberichte, 32, 1915, pp. 137–140 and 147–151.

From the above encyclopedia we gather that 1000 pounds of animal may yield a daily supply of manure having the following realtive weights: Sheep 34.1; Calves 67.8; Pigs 83.6; Cows 74.1; Horse 48.8; Fowls 39.8. Presumably a thousand pounds of Mockingbirds might yield something of the order of weight of the fowl; and this would be concentrated in value owing to the retention of the water by the bird. Thus the values assigned to the various excreta of 1000 pounds of the above animals for a year is: Sheep $26.00; Calves $24.45; Pigs $60.88; Cows $29.25; Horses $27.74; and Fowls $51.10. While the fowl is close second to the pig it may be conceded that this will not apply to all birds. Only future determinations can show where the song birds stand in value from this point of view; but that a thousand pounds of song bird is worth to the land fifty dollars a year is a tentative surmise.

That different birds have different values is obvious from the following analyses, showing the nitrogen etc. in manures of domestic birds. In the Hen: nitrogen 1.60, phosphoric acid up to 2.00, potash up to .90; in the Duck: nitrogen 1.00, phosphoric acid 1.40, potash .62; in the Goose: nitrogen 0.55, phosphoric acid 0.54, potash 0.95; in the Pigeon: nitrogen 1.75, phosphoric acid up to 2.00, potash 1.25.

While actual study may show that the excreta of common song birds have but little manurial value, the above strongly suggests that as birds their excreta may be expected to yield much of three great soil fertilizers, nitrogen, potash and phosphoric compounds which man intentionally seeks out to feed to his special plant crops.

Thus the bird may be said either to add to the plant food man uses or to lessen the amount that man must apply, in any case the bird is useful along the same lines as the man who uses chemical fertilizer and is an aid to man in his efforts of this nature.

Moreover, theory demands that waste of animal be larger when the animal does more work and though it may not seem much work for a bird to sing yet the spontaneous effort puts into action muscles which cannot continue to work without more food and without setting free products that finally increase the waste from the body.

In brief, the more song the more enrichment of the soil. The more enrichment of the soil, the more seed and insect and the more birds and so on; and it is into this complex round of activities that man comes in as a link; wishing more song, less weed seed, less "injurious" insect survival and better crops.

In protecting song birds we increase the pleasure of existence; diminish the labors of getting food; and help in a natural betterment of the soil.

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THE BIRD FAUNA OF NORTH AMERICA IN RELATION TO ITS DISTRIBUTION IN SOUTH AMERICA

BY ELSIE M. B. NAUMBURG.

MORE than one hundred species of birds leave the United States after the nesting season is over to spend the winter in South America, while others are either resident in their breeding area or find suitable winter quarters in the southern part of the North American continent. There are also species which are residents on both continents, breeding in both and still others which range into other parts of the world as well.

The North American birds, therefore, that occur also in South America, fall into three classes:

I. Distinctively North American types, migrating to South America for the winter.

II. Birds common to North and South America and probably breeding throughout the greater part of their habitat.

III. Birds of cosmopolitan distribution.

Each species must be studied throughout its range if we are to arrive at facts from which the whole narrative of migration and distribution may be read. Even among individuals of the same species, moreover, there are vast differences in migratory habits, and winter distribution cannot be determined from the summer home.

In the following lists the winter distribution of each species has been compiled from such published records as we have and additional data obtained from specimens in the collections of the American Museum of Natural History the latter source being indicated by an asterisk. Subspecies are not considered in the present paper as it is not always clear to which of several races the references apply.

CLASS I. DISTINCTIVELY NORTH AMERICAN BIRDS WINTERING IN SOUTH AMERICA.

Stercorarius parasiticus. PARASITIC JAEGER.—To Brazil (inaccurate).

Larus franklini. FRANKLIN'S GULL.—Chile and Brazil.

Larus atricilla. LAUGHING GULL.—Chile and Brazil.

Xema sabini. SABINE'S GULL.—Peru.

Sterna maxima. ROYAL TERN.—Peru and Brazil.

Sterna sandvicensis. SANDWICH TERN.—North Carolina to Brazil.

Sterna elegans. ELEGANT TERN.—Pacific coast, south to Chile.

Sterna forsteri. FORSTER'S TERN.—Casual in Brazil.

Sterna hirundo. COMMON TERN.—Florida to Brazil.

Sterna dougalli. ROSEATE TERN.—Bahamas to Brazil.

Sterna antillarum. LEAST TERN.—Venezuela and Peru.

Sterna fuscata. SOOTY TERN.—Louisiana to Brazil.

Chlidonias nigra. BLACK TERN.—Mexico to Dutch Guiana; Peru (Callao Bay) and Chile.

Querquedula discors. BLUE-WINGED TEAL.—Brazil, Ecuador.

Querquedula cyanoptera. CINNAMON TEAL.—Peru, Brazil, south to Falkland Islands.

Marila affinis. LESSER SCAUP.—Ecuador.*

Steganopus tricolor. WILSON'S PHALAROPE.—Central Chile, Central Argentina.

Lobipes lobatus. NORTHERN PHALAROPE.—Ecuador.*

Gallinago delicata. WILSON'S SNIPE.—Colombia and southern Brazil.

Limnodromus griseus. DOWITCHER.—Northern Brazil.

Micropalama himantopus. STILT SANDPIPER. Uruguay and Chile, Ecuador.*

Canutus canutus. KNOT.—Ecuador.

Pisobia maculata. PECTORAL SANDPIPER.—Peru, Bolivia, Ecuador,* northern Chile.

Pisobia fuscicollis. WHITE-RUMPED SANDPIPER.—Paraguay to southern Patagonia.

Pisobia bairdi. BAIRD'S SANDPIPER.—Ecuador, Chile, Argentina, Patagonia.

Pisobia minutilla. LEAST SANDPIPER.—Brazil, Chile, Ecuador, Galapagos Islands.

Ereunetus pusillus. SEMIPALMATED SANDPIPER.—Patagonia, Ecuador.*

Ereunetus mauri. WESTERN SANDPIPER.—Venezuela, Ecuador.*

Calidris leucophaea. SANDERLING.—Patagonia, Ecuador.*

Limosa haemastica. HUDSONIAN GODWIT.—Argentina, Patagonia.

Totanus melanoleucus. GREATER YELLOW-LEGS. Patagonia, Ecuador.*

Totanus flavipes. YELLOW-LEGS.—Argentina, Chile, Ecuador,* Patagonia.

Tringa solitaria. SOLITARY SANDPIPER.—Argentina, Ecuador.*

Catoptrophorus semipalmatus. WILLET.—Brazil, Peru, Ecuador.*

Heteractitis incana. WANDERING TATTLER.—Galapagos, Ecuador.*

Bartramia longicauda. UPLAND PLOVER.—Pampas of South America to Argentina, Ecuador.

Tryngites subruficollis. BUFF-BREASTED SANDPIPER.—Argentina, Uruguay, Ecuador.*

Actitis macularia. SPOTTED SANDPIPER.—Southern Brazil, Ecuador,* Central Peru.

Numenius hudsonicus. HUDSONIAN CURLEW.—Ecuador, southern Chile, British Guiana, mouth of Amazon.

Numenius borealis. ESKIMO CURLEW.—Argentina, Patagonia.

Pluvialis dominicus. GOLDEN PLOVER.—Campo of Brazil and Argentina.

Oxyechus vociferus. KILLDEER.—Venezuela and Peru, Ecuador.*

Charadrius semipalmatus. SEMIPALMATED PLOVER. Patagonia, Chile, Ecuador,* Galapagos.

Charadrius nivosus. SNOWY PLOVER.—Venezuela and Brazil.

Aphriza virgata. SURFBIRD.—Chile to Straits of Magellan.

Ardea herodias. GREAT BLUE HERON.—Venezuela.

Butorides virescens. GREEN HERON.—Extreme northern—South America.

Fulica americana. COOT.—Colombia.

Porzana carolina. SORA.—Venezuela and Peru.

Circus hudsonius. MARSH HAWK.—Colombia.

Buteo platypterus. BROAD-WINGED HAWK.—Venezuela, Peru, Ecuador.

Buteo swainsonii. SWAINSON'S HAWK.—South America, south to Chile.

Falco columbarius. PIGEON HAWK.—Ecuador and Venezuela.

Pandion haliaetus. OSPREY.—Peru, Ecuador, Paraguay.

Elanoides forficatus. SWALLOW-TAILED KITE. Peru, Bolivia, Ecuador, Paraguay.

Coccyzus americanus. YELLOW-BILLED CUCKOO. Ecuador, Bolivia, Argentina.

Coccyzus erythrophthalmus. BLACK-BILLED CUCKOO. Colombia amd Peru.

Ceryle alcyon. BELTED KINGFISHER.—Colombia and Guiana.

Chordeiles virginianus. NIGHTHAWK.—Brazil and Argentina.

Antrostomus carolinensis. CHUCK-WILL'S-WIDOW.—Colombia.

Tyrannus tyrannus. KINGBIRD.—Colombia and British Guiana, Peru and Bolivia.

Myiarchus crinitus. CRESTED FLYCATCHER.—Colombia.

Nuttalornis borealis. OLIVE-SIDED FLYCATCHER.—Colombia to Peru.

Myiochanes virens. WOOD PEWEE.—Colombia and Peru.

Myiochanes richardsoni. WESTERN WOOD PEWEE.—Ecuador, Peru and Bolivia.

Empidonax virescens. GREEN-CRESTED FLYCATCHER.—Colombia and Ecuador.

Empidonax trailli. TRAILL'S FLYCATCHER.—Colombia.

Empidonax minimus. LEAST FLYCATCHER.—Peru.

Dolichonyx oryzivorus. BOBOLINK.—Southern Brazil, Bolivia and Paraguay.

Icterus galbula. BALTIMORE ORIOLE.—Colombia.

Zamelodia ludoviciana. ROSE-BREASTED GROSBEAK.—Colombia and Venezuela.

Spiza americana. DICKCISSEL.—Colombia and Venezuela.

Piranga erythromelas. SCARLET TANAGER.—Colombia, Bolivia, and Peru.

Piranga rubra. SUMMER TANAGER.—Ecuador, Peru and Guiana.

Petrochelidon lunifrons. CLIFF SWALLOW.—Brazil, northern Argentina and Central Chile.

Hirundo erythrogastra. BARN SWALLOW.—Brazil, northern Argentina and Central Chile.

Riparia riparia. BANK SWALLOW.—Brazil and Peru.

Progne subis. PURPLE MARTIN.—Brazil.

Vireosylva olivacea. RED-EYED VIREO.—Colombia, Ecuador and southern Brazil.

Mniotilta varia.[1] BLACK AND WHITE WARBLER.—St. Augustine, Fla., and southern Texas, through the West Indies to Venezuela and Ecuador. [*Colombia*, Salentos, Sept. 27, Las Lomitas, March 2, Santa Maria Region, August 21, March 12. *Venezuela*, Estado Carabobo, Las Trincheras, Oct. 9, Escorial, near Merida, Feb. 24.]

Protonotaria citrea. PROTHONOTARY WARBLER.—Nicaragua to Venezuela. [*Colombia*, Algondonal, January 23, Santa Marta Region, Sept. 11. *Ecuador*, Esmeraldas, Nov. 7.]

Vermivora chrysoptera. GOLDEN-WINGED WARBLER.—Guatemala to Colombia. [*Colombia*, El Eden, October 19, Villavicencio, March 11, Santa Marta Region, September 6, March 20. *Venezuela*, Nebrados, Merida, Aug. 12.]

Vermivora pinus. BLUE-WINGED WARBLER.—Northern Mexico to Guatemala and casually to Colombia. [A single specimen, Santa Marta region, Mar. 21.]

Vermivora peregrina. TENNESSEE WARBLER.—Southern Mexico to Venezuela. [*Colombia*, Sta. Elena, December 1, Miraflores, April 19, Santa Marta Region, Oct. 14, April 4. *Venezuela*, Merida, November 24.]

Dendroica aestiva. YELLOW WARBLER.—Southern Mexico to Peru and northeastern Brazil. [*Colombia*, Barbacoas, October 3, San Augustin, April 12, Santa Marta Region, September 11, May 1. *Venezuela*, Valle, Merida, November 30, Escorial, March 19.]

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[1] In the case of the Warblers additional migration or winter dates and localities are given. These are all taken from specimens in the American Museum of Natural History, excepting those from the Santa Marta Museum region, which are taken from Annals of the Carnegie Museum, Vol. XIV, Oct., 1922, 'Birds of Santa Marta Region' by Todd and Carriker.

Dendroica caerulea. CERULEAN WARBLER.—Western South America from Panama to Peru. [*Colombia*, Buena Vista, March 4. *Ecuador*, Rio Oyacachi, Abajo Chaco, August 10, San José Abajo, March 30.]

Dendroica fusca. BLACKBURNIAN WARBLER.—Central Mexico to Venezuela; Peru; casual to West Indies. [*Colombia*, Santa Isabel, September 22, Puente Andalucia, April 22, Santa Marta Region, February, March, April. *Venezuela*, Escorial, Merica, October 14. *Ecuador* (Prov. Loja), Zamora, November 3, Sumaco Abajo, January 8. *Peru* (Prov. Junin), Utcuyacu, November 25, Chelpes, April 22.]

Dendroica castanea. BAY-BREASTED WARBLER.—Panama and Colombia. [*Colombia*, Honda, November 23, Malena, March 10, Santa Marta Region, October 27.]

Dendroica striata. BLACK-POLL WARBLER.—Northern South America to Ecuador, Guiana and eastern Brazil. [*Colombia*, Rio Frio, November 25, Villavicencio, March 11, Santa Marta Region, September 29, February 28, *Venezuela*, Merida, October 4, April 29.]

Seiurus aurocapillus. OVENBIRD.—Western Mexico to northern South America[1]; mostly by the West Indies, the Bahamas, southern half of Florida and casually southern South Carolina and southern Louisiana.

Seiurus motacilla. LOUISIANA WATER THRUSH.—Mexico to Colombia, South America, most of the West Indies and the Bahamas.

Seiurus noveboracensis. NORTHERN WATER-THRUSH.—Northern South America. [*Colombia*, W. Quindio, Salento, Oct. 1, Huila, near San Augustin, April 24, Santa Marta Region, March 17, Sept. 8. *Venezuela*, Tucacas, Estado Falcon, October 19, Boca de Sina, Cunucunuma River, Upper Orinoco, March 10.]

Oporornis formosa.[2] KENTUCKY WARBLER.—Southern Mexico to Colombia, South America. Accidental in the West Indies. [*Colombia*, Santa Marta, Bonda, Oct. 7, Nov. 24.]

Oporornis philadelphia. MOURNING WARBLER.—Nicaragua to Ecuador. [*Colombia*, Rio Frio, Cauca, November 25, Villavicencio, March 12, Santa Marta region, between Feb. 12 and March 25, April 11. *Venezuela*, Escorial, December 14. *Ecuador*, Oyacachi, Abjao Chaco, January 17.]

Oporornis tolmiei. MACGILLIVRAY'S WARBLER.—Lower California to Colombia, South America.

Oporornis agilis. CONNECTICUT WARBLER.—Northern South America, the West Indies in migration. [*Colombia*, Santa Marta Region, Bonda, Oct. 22.[3] *Venezuela*, Maipures, Upper Orinoco, April 28. *Brazil*, Sao Laurenco River, December 26, January 2.]

[1] An individual secured by one of Mr. Smith's collectors on Oct. 4, 1899, constitutes the only record for the Santa Marta region and is the only South American record for the species which ordinarily does not pass to the southward of Costa Rica during the winter months.

[2] There are only four records of this species in South America, all from the Santa Marta region.

[3] It is not yet clear whether this species actually winters in this region or is merely a transient during migration.

Wilsonia canadensis. CANADA WARBLER.—Guatemala to Peru. [*Peru*, Prov. Junin, La Merced, November 19, Prov. Chaupe, February 9.]

Setophaga ruticilla. REDSTART.—Mexico and West Indies to Ecuador and British Guiana. [*Colombia*, Salento, September 28, Buena Vista, March 3, Santa Marta region, August 24, May 1. *Venezuela*, Valle, Merida, November 28, Escorial, March 14.]

Hylocichla fuscescens. VEERY.—Colombia, British Guiana and Brazil.

Hylocichla ustulata. OLIVE-BACKED THRUSH.—East Ecuador, British Guiana, Peru, Bolivia, Brazil and Argentina.

Hylocichla aliciae. GRAY-CHEEKED THRUSH.—Ecuador, Peru, Venezuela and British Guiana.

CLASS II. BIRDS COMMON TO NORTH AND SOUTH AMERICA AND BREEDING IN BOTH CONTINENTS

Very few land birds have a common breeding distribution in North and South America, as most of those occurring on the two continents are only winter migrants in the latter; and but few are residents. The list is as follows:

Podilymbus podiceps. PIED-BILLED GREBE.—Breeds from Canada to Chile and Argentina.

Geochelidon nilotica.[1] GULL-BILLED TERN.—Breeds from coasts of Texas, Virginia, etc. to Argentina.

Anous stolidus. NODDY TERN—Breeds from Florida Keys to Brazil.

Phalacrocorax vigua. MEXICAN CORMORANT.—Breeds from southern Illinois, etc. to Patagonia and Chile.

Pelecanus occidentalis. BROWN PELICAN.—Breeds from Florida and Louisiana to Brazil.

Dendrocygna fulva. FULVOUS TREE DUCK.—Breeds from southern Unites States to tropical South America.

Ajaia ajaja. ROSEATE SPOONBILL.—Breeds from Texas, Florida, etc. to Patagonia.

Guara alba. WHITE IBIS.—Breeds from Lower California, Texas and South Carolina, to Brazil and Peru.

Plegadis guarauna. GLOSSY IBIS.—Breeds from southern Oregon, Texas and Florida to southern South America.

Ixobrychus exilis. LEAST BITTERN.—Breeds from Canada to West Indies and Brazil.

Casmerodius egretta. EGRET.—Breeds from Oregon, California and North Carolina, to Patagonia.

Egretta candidissima. SHOWY HERON.—Breeds from South Carolina to Chile and Argentina.

Hydranassa tricolor.[2] LOUISIANA HERON.—Breeds from the Gulf States to Venezuela and Guiana.

[1] Nearly cosmopolitan.

[2] From Natterer's localities and dates it should nest in Brazil as it certainly does in Chile.

Florida caerulea. LITTLE BLUE HERON.—Breeds from Southern States to Argentina and Peru.

Nycticorax nycticorax. NIGHT HERON.—Breeds from Canada to Patagonia.

Nyctanassa violacea. YELLOW-CROWNED NIGHT HERON.—Breeds from southern states to Brazil and Peru.

Ionornis martinicus. PURPLE GALLINULE.—Breeds from Texas, and South Carolina to Ecuador and Paraguay.

Gallinula galeata. FLORIDA GALLINULE.—Breeds from Central States to Chile, Argentina and the Galapagos.

Himantopus mexicanus. BLACK-NECKED STILT.—Breeds from California, etc. to northern Brazil and Peru.

Hæmatopus palliatus. OYSTER CATCHER.—Breeds from Texas, Louisiana and Virginia to southern Brazil and central Chile.

Cathartes aura. TURKEY VULTURE.—Breeds from southern Canada, south to southern South America.

Catharista urubu. BLACK VULTURE.—Breeds from the Southern States to southern South America.

Elanoides forficatus. SWALLOW-TAILED KITE.—Breeds locally from Central States and South Carolina to Peru, Bolivia and Paraguay.

Elanus leucurus. WHITE-TAILED KITE.—Breeds fom California and South Carolina to Argentina, Chile and Venezuela.

Rostrhamus sociabilis. EVERGLADE KITE.—Breeds from tropical Florida to Argentina.

Buteo albicaudatus. WHITE-TAILED HAWK.—Breeds in Arizona, New Mexico and southwestern Texas.

Speotyto cunicularia. BURROWING OWL.—Breeds from western United States, and southern Florida; to Chile, Brazil, and Paraguay.

Glaucidium phalaenoides. PIGMY OWL.—Breeds from southern border of the United States to southern Brazil, Colombia, Venezuela, and Peru.

Crotophaga sulcirostris. GROOVE-BILLED ANI.—Breeds from the lower Rio Grande Valley, and southern Lower California southward.

Ceryle torquata. KINGFISHER.—Breeds from the Lower Rio Grande Valley over the greater part of South America (Colombia, to Argentina, Bolivia and Peru).

Ceryle americana. TEXAS KINGFISHER.—Breeds from southern Texas, to southern Brazil.

Cypseloides niger. BLACK SWIFT.—Breeds from southern British Colombia to British Guiana.

Amazilia tzactl. RIEFFER'S HUMMINGBIRD.—Breeds from the Lower Rio Grande Valley to Venezuela.

Tyrannus melancholicus. COUCH'S KINGBIRD.—Breeds from the lower Rio Grande Valley to Brazil and Paraguay.

Pitangus sulphuratus. DERBY FLYCATCHER.—Breeds from the Lower Rio Grande Valley, to Ecuador, Bolivia and Argentina, Guiana, southeast Brazil.

Pyrocephalus rubinus. VERMILION FLYCATCHER.—Breeds from the southwestern border of the United States, to Colombia, Peru, Guiana, Brazil, Argentina, and Galapagos.

Muscivora tyrannus. FORK-TAILED FLYCATCHER.—Breeds from Mexico throughout South America.

Otocoris alpestris. HORNED LARK.—North America to Colombia (Bogotá).

Megaquiscalus major. GREAT-TAILED GRACKLE.—South Atlantic and Gulf States to Bogota, Colombia and W. Peru.

Progne chalybea. CUBAN MARTIN.—Breeds from the lower Rio Grande Valley to Peru, Bolivia and southern Brazil.

CLASS III. NORTH AMERICAN BIRDS OF COSMOPOLITAN DISTRIBUTION.

The majority of species of cosmopolitan or nearly cosmopolitan distribution belong to the Charadriidae a family notable for the extended migratory flight of its species though most of them breed only in the far north.

In this group may be placed the following, although some of those listed in Class I, may with equal justice be included here.

Canutus canutus KNOT.
Calidris leucophaea. SANDERLING.
Squatarola squatarola. BLACK-BELLIED PLOVER.

As nearly cosmopolitan breeding birds may also be mentioned.

Pandion haliaetus. OSPREY.
Asio flammeus. SHORT-EARED OWL.

ON THE NATURE OF THE RELATIONSHIP EXISTING AMONG LAND BIRDS DURING SUSTAINED AERIAL MIGRATION.

BY CHARLES L. WHITTLE.

THE following article is in part manifestly speculative, but sufficient data are in hand to seem to warrant its publication for the purpose of calling attention to the sort of observations which can be made to test the hypothesis advanced.

My attention and that of Mrs. Whittle was once directed for a period of four hours to the manner Myrtle Warblers (*Dendroica coronata*) were migrating.[1] During this period many detached flocks of ten to twenty or more individuals flew across a narrow strait between two islands, the Isle of Palms and Sullivan Island, lying easterly of Charleston, South Carolina, flying northeasterly up the coast. The total birds of this species moving northward during these four hours was not less than 24,000. These birds were unaccompanied by any other species, or at least negligibly so for no other species was seen, the date (March 4, 1920) being too early to expect "mixed" migration.

A short distance to the southwest at a place on Sullivan Island which forms the first land on the northerly side of the entrance to Charleston Harbor, this mighty host of Warblers, having crossed the entrance to Charleston Harbor, was traveling northeast on the land in a very scattered and disorganized manner, but these same birds when they again took themselves to the air, shortly afterwards, assumed the grouping already described.

A natural question to ask oneself on witnessing this great movement of small groups of a single species of Warbler is: would these groups still remain intact if other species of Warblers in numbers, and, say Vireos, were migrating with them?

The above facts, and other observations made prior to and since that date, to be described, have led to the formation of the hypothesis that had there been another species or several species of Warblers, or species belonging to other families, migrating

[1] "A Myrtle Warbler Invasion," 'The Auk', vol. XXXIX, 1922, pp. 23–31.

with the Myrtles, the grouping of the Myrtles witnessed would have been essentially the same, and it is further premised that other species migrate in this manner as a rule, that is, during the time of actual, sustained, regular migration on the wing. The hypothesis is extended further to include a like grouping of many species when migrating together, the presumption being that the more unrelated the species, the more distinct the grouping. In essentials this hypothesis is merely extending the obvious habit of group formation which in New England begins each year at molting time, or shortly after, and is witnessed so frequently throughout the winter, to include also the periods of migration. On the face of it, for many species to abandon a habit so prevalent during so much of the year (excluding the periods of courtship and nidification) would be a matter of surprise. Specific affinity alone is doubtless potent even when no stronger chord exists to cause aggregation, and it is held that when like species have the opportunity during migration to form groups they will do so.

The hypothesis has nothing to do with migration or movements by day when birds have come to earth for rest and food and are seen in composite, straggling flocks, feeding their way towards their summer or winter home, or are awaiting suitable weather to continue their flight, following the snow or food line, etc. During such times the groupings observed are likely to be due to stagnant gettings-together of several species on a basis of the kinds of food eaten.

In the nature of the case, the study of this problem is hedged about with almost insurmountable difficulties, and I can do little at this time except to mention some of the additional phenomena that have appealed to me as indicating that some species of land birds do not migrate to and from their nesting grounds in a disorganized rabble, but as a whole in something like an orderly, organized way, even when several species are migrating together.

That so little information bearing on the subject appears in the literature, when doubtless many unrecorded and pertinent observations have been made, is unfortunate. Had more observers been afield just before sunrise during migrations, I feel that many observations bearing on this hypothesis would now be available.

Observers commonly view the "migrating hosts" considerably after sunrise when the birds have come to earth and appear in highly complex bodies consisting of several or many species, each individual in search of food and unconcerned with its immediate neighbors. Such complex flocks arise in some instances by various species collecting together, say seed-eaters, in some small area where suitable food occurs in quantity. Various species of Warblers, and other birds requiring insect food, search the tree-tops and are usually seen moving collectively in various directions at such times, but on the whole working towards their objectives. Birds observed at such times are usually devoid of any apparent tendency towards species segregation, but our hypothesis requires that when such heterogeneous admixtures of species get under way in actual migration, they tend to collect into little groups, which either form disconnected parts of great aggregations of the same species, like the Myrtle Warblers described, or which migrate as little groups separated from other nearby groups of other species.

It is of course disclaimed at the outset that such things as stragglers do not occur with other species in strictly aerial migration. Cases of unorganized mixtures of several species must occur with some frequency due to the weather vicissitudes met with in migration, and from other causes. My experience has been that the early morning offers the best opportunity to study certain aspects of bird migration, that is, during twilight or soon afterwards, before the birds have scattered in search of food. At such times little, isolated groups of a single species are often seen, arriving groups they may be called. To see such groups in the morning twilight is next best to actually witness them drop from the sky.

There is little definite information as to the origin of wintering groups of many species, which are familiar to every one much afield at this season, but obviously, the most natural one would appear to be the family. Another theoretical migrating group may have its origin in the family unit plus birds of the same species reared in very local nesting areas, thus constituting a "neighborhood" group. During the spring migration, the habit, believed to be quite wide-spread, of arriving at their nesting grounds

at different times, depending on age or sex (segregated sexes), the males often well in advance of the females and young, may be another factor. Whatever may be the facts, there are some observations that weaken the view that migration takes place in a chance distribution of the contained individuals.

Data of this kind can be obtained best perhaps by observing the habits of migrating species while crossing areas in which they do not nest or do not winter, for in such areas accessions and losses tending to confuse the observer, are reduced to a minimum.

It is appropriate briefly to pass in review a few examples of wintering groups among migratory species as seen on the land, and other groups of birds seen on their nesting grounds just prior to leaving on their southward migration. The following is a very common experience that will serve as typical of many witnessed by nearly every field observer, an experience dealing with what I am beginning to refer to in my notes as "migratory units": On October 25, Mrs. Whittle and I spent the latter part of the afternoon in mixed spruce and pine woods with pasture areas interspresed on the slope of Monadnock Mountain in New Hampshire. The red spruces were shedding their fruit in abundance and this was the food being eaten by most of the migrants noted—Juncos, Red-breasted Nuthatches, Golden-crowned Kinglets, Fox and White-throated Sparrows, the four latter species in small groups of 4–6 in the case of Kinglets and Nuthatches, and 8–10 or more in case of the two species of Sparrows. A visit to this place the following day showed that the group of Sparrows and Red-breasted Nuthatches had left during the previous night, the Sparrows, at least, resuming their migration, and as these birds were present in well separated groups the first day it is probable that they resumed their journey as groups. As Chapman well says: "They (White-throated Sparrows) are always in little companies," that is, during migration in September. These "little companies" are my migratory units and such companies are by no means confined to this species or to the Fringillidae. I have witnessed them in other members of this genus, among Golden-crowned and Harris's Sparrows, and among Tree Sparrows, Fox Sparrows, Rusty Blackbirds, etc.

Bluebirds, both parents and two broods of young, have been

observed to maintain family relations in New England up to the time of their departure in November. One cannot help believing that such a group retains this organization for a longer period than the one observed. i. e. that the birds maintained this grouping on the journey south.

During the winter of 1923–24, a group of seven White-throats wintered near my banding station. They appeared at the station together and often visited the trap together. They remained close together during the day-time and flew to a nearby group of white pines for the night.

In Cohasset during the fall, winter and spring, Juncos occurring in scattered groups, seldom exceeding thirteen or fourteen, may be observed, but at dusk many congregate in the junipers at a common Junco roosting place. In the morning they break up again, and this grouping day after day is approximately the same as is shown at least by the birds feeding at my banding station. Chickadees make their rounds in search of food in groups seldom exceeding seven. Tree Sparrows occur similarly in small groups, though often under certain conditions numbering more birds. I once saw in mid-winter twenty-five of this latter species, which were attracted to a common feeding place where a small stream flowing into a swamp which was kept free from snow nearly all winter, separate into three flocks and fly away in different directions.

Juncos are first observed in the fall about my banding station in small flocks. The rule is that a little flock appears and additions usually consist of the arrivals of more flocks, and what is true of this species is true also of Tree Sparrows and of White-throats. A more detailed record of this species at this station seems pertinent. On the 21st of October, 1925, the first Juncos in the fall migration appeared in my door-yard, seven or eight in number, four at least being banded, and the following day they visited my ground trap and feeding shelf for canary-seed. These were seen off and on until December 19, when a second group of Juncos, eight or ten in number, arrived, among which were four or five more banded birds. This flock like the first one fed ravenously for two or three days, and then came less often to the station. By means of the banded birds the flocks in both groups were kept track of, and on January 9, 1926, all the banded birds

were trapped during a period of five hours and twenty minutes, and their numbers read,—nine returns and second returns. These are mentioned to show the means used to identify the groups, the pertinent part of the matter, however, being the sudden appearance of the two groups of birds and their persistence.

Fox Sparrows, as far as my experience goes, arrive in the spring migration in little groups, usually of eight to twelve birds, which apparently remain together until migration is resumed. Examples of this kind have been observed among Song Sparrows, but much less frequently. One or two examples observed this spring, however, are of interest. The latter part of March, 1926, Song Sparrows appeared at my banding station in numbers, and by April 7, ten were banded. They remained about ten days and suddenly disappeared during the night of April 10, none of the group being seen again up to April 23. About April 7, several more Song Sparrows appeared, four of which were large rangy birds averaging 2.90 grams heavier than the average weight the first group. These remained only a day or two and also disappeared about April 10. Attention is called especially to the unusually heavy birds,[1] which appeared to be an isolated group (a migratory unit) set off as such among the smaller Song Sparrows composing the bulk of the then migrating birds.

On several occasions in an area carefully canvassed I have noted very early in the morning small groups of just-arrived migrants—Yellow Palm Warblers (*Dendroica p. hypochrysea*), Ruby-crowned Kinglets, etc., with no other associated migrants, and such groups are seen both spring and fall.

At Cohasset several pairs of Catbirds which fed at my station during 1924 with young, at least in part, moved to a neighboring

[1] Apart from the interest these birds have as constituting a possible migratory unit, there remains the interest due to their apparent greater weight than the average of the Eastern Song Sparrows, as far as I have determined it by weighing in all twenty-two birds, not including the four above mentioned. The fact that four such heavy birds appeared together may have additional significance. At Mrs. Whittle's banding station in Peterboro, N. H., for two successive years in October a few of this type of Song Sparrow have appeared in her traps and have been banded, and her notes describe them as "large rangy birds." We have even come to think of them as constituting a possible example of a northern *race* of the Eastern Song Sparrow which has never been obtained on its breeding grounds and which at present is represented by the abnormally large birds in our museums, birds collected perhaps only as migrants.

swamp to molt. When this was completed, and migration was in order, the swamp was not depopulated of its Catbirds in a night, but in two or three contingents, the last leaving October 5. It is not unlikely that these leaving groups formed migratory units and were perhaps of the family order.

In Peterboro, N. H., every season beginning about August 9, during molting time and continuing with increasing numbers, to as late as September 15, there is present at Mrs. Whittle's banding station a flock of Chipping Sparrows, sometimes reaching a total of at least thirty. During 1924, such a group contained several of her banded birds, which nested or were raised about the banding station, and every day one or more of them would come to the traps for food, only to return to the flock when their hunger was appeased. Such a group would feed within narrow limits for days, or it would range about and return occasionally. Something determines the complexion of such small groups. In part I know it to be made up of families, or parts of families, of both adult and young birds. It is possible, considering the fact that the coming together begins before migration has begun, that the unbanded members were similarly local birds which did not come to the traps owing to the fact that they nested too far away, say four or five hundred feet from the station, the radius of this species' range during the nesting season being a very restricted one. As these birds kept together for weeks, and disappeared suddenly for the season in September, it manifestly constituted a migratory Chipping Sparrow unit, at least at the beginning of the southward movement. My knowledge of this group for 1924, ends at this point, but I find it difficult to believe that a tie which bound this group together for so long was severed during the journey south. When it shall be shown, as it has been to a certain extent in the case of White-throats and Tree Sparrows,[1] that certain groups of birds of these species winter in certain localities year after year, the presumption that the group migrates as such will be increased.

Regarding Warbler migration, the following observations made

[1] See Articles by Wendell P. Smith and Don V. Messer in the Bulletin of the Northeastern Bird Banding Association, Vol. II, No. 2, 1926, pp. 19–22, and pp. 28–31.

by E. H. Forbush on May 11, 1900, at Amesbury, Mass.,[1] are pertinent: "As we walked through the streets of the village many male Blackburnian Warblers were seen * * * . A little later we saw them all about us in the orchards * * * . As we approached the wood, it was everywhere the same. The Blackburnian Warblers had come in the night and were busy hunting for their breakfast. (This period was from daybreak till 7 A.M. when he returned to the village for breakfast.) * * * At 8 o'clock not a single Blackburnian was to be seen. I scoured the country until nearly noon finding all the other Warblers as at daybreak, but not a Blackburnian could be found. They had done their share in the good work (eating insects) and had passed on." To account for the changed conditions between the time Mr. Forbush left the birds and his return (after an absence of an hour) there are two possibilities: (1) that the Blackburnians had, as a species, left their companions and moved along; or (2) that they were when first seen included in a moving stream of other species and during his absence the Warbler stream had moved along, bringing to the same place an hour later a portion of it devoid of this species, the latter view being the more probable one, altho Mr. Forbush appears to have entertaind the former explanation. In either case the observations made show definitely that the Blackburnians were not distributed throughout the Warbler "wave." In other words, they were in a measure concentrated in the wave, and it seems probable that when aerial migration was resumed they maintained this relationship, that is, were segregated as a species.

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[1] 'Useful Birds and their Protection,' page 102.

ON THE USE, BY BIRDS, OF SNAKES' SLOUGHS AS NESTING MATERIAL.

BY JOHN K. STRECKER.

THE following is quoted from Frank Finn's interesting book, 'Bird Behavior' (New York, Dodd, n. d., p. 311): "Rather reminiscent of both Bower-birds and Shrikes is the trick some birds have of lining, and possibly, in their own opinion, ornamenting, their nests with curious objects of animal origin, the most conspicuous cases being of those birds which insist on using a snake's slough for this purpose, such as the Great-crested Flycatcher (*Myiarchus crinitus*), one of the American Tyrants, and the Rufous Warbler (*Aedon galactodes*) of Europe; in India, the Black Robins (*Thamnobia*) and that burrowing Starling, the Bank Mynah (*Acridotheres gingianus*) also have this curious selective habit. ***All of the birds with this liking for snakes' old clothes breed in holes,*** and it has been suggested that the slough is used to terrify intrusive lizards, which are no friends to eggs and young birds, and are themselves preyed upon by snakes."

I have caused to be italicized the first part of the last sentence quoted from Mr. Finn's book, for his statement cannot be confirmed. For many years, in fact, ever since I first became a student of the science of herpetology, I have been interested in this peculiar nesting habit. I personally know of three species of North American birds (*Myiarchus crinitus*, *Baeolophus atricristatus*, and *Guiraca caerulea*), which almost invariably make use of one or more snakes' skins, torn into large or small fragments, in the making and ornamenting of their nests. Two of these birds, the Flycatcher and the Titmouse, nest in holes, the third does not. A fourth species, the Roadrunner, as I know from observation, as well as through my reading, frequently lines its nest with pieces of cast-off snake skins. This ground Cuckoo nests in the open.

In addition to the four so far named, I have found nests of two other species with snake-skins in their composition. One of these birds breeds in holes in logs and crevices among rocks, the other

nests in bushes. The Rufous Warbler (*Aedon galactodes*) of southern Europe and northern Africa, mentioned by Finn, does not breed in holes, but if I am to believe the notes of those who have actually studied the bird in its breeding haunts, it constructs its nest in a clump of cactus or in a small bush.

I have compiled all of the information that I have been able to discover concerning the use of snakes' skins as nesting material and find that I have a list of birds representing seven different families: *Cuculidae*, one species; *Sturnidae*, one; *Tyrannidae* (including subspecies), four, possibly five; *Fringillidae* (including one subspecies), three; *Turdidae*, three; *Troglodytidae*, one; *Paridae* one. Total, fourteen species and subspecies.

The single species of *Cuculidae* is the Roadrunner (*Geococcyx californianus* (Lesson)). This bird is now scarce in most portions of central Texas, but I find two references in my notes of finding snakes' sloughs in nests. In 1904 and 1905, I examined many nests in western Texas, but have mislaid the note-books of my mountain and plains trips and cannot be positive whether I found sloughs in any of these, but rather incline to the belief that I did. Edmund C. Jaeger (Denizens of the Desert, Boston, Houghton, 1922, p. 13), mentions "the Roadrunner's rude home, lined with almost everything from a snake-skin to bits of manure." Florence Merriam Bailey, in her 'Handbook of the Birds of Western United States' (Boston, Houghton, fourth edition, 1914), describes the nest of this species as containing pieces of snakes' skins. So the habit with this bird seems to be pretty generally known.

The representative of the *Sturnidae* is the Bank Mynah (*Acridotheres gingianus* (Latham)). In Hume's 'Nests and Eggs of Indian Birds' (second edition, London, 1889, Vol. 1, pp. 381–382), I find the following interesting account of the nest of this species: "The egg-chamber is floored with a loose nest of grass, a few feathers, and, in many instances, scraps of snake-skins." Then the same author follows with comments on the "snake-skin" habit: "Are birds superstitious, I wonder? Do they believe in charms? If not, what induces so many birds that build in holes in banks to select out of the infinite variety of things, organic and inorganic, pieces of snake-skins for their nests? They are at

best harsh, unmanageable things, neither so warm as feathers, which are ten times more numerous, nor so soft as cotton or old rags, which lie about broadcast, nor so cleanly as dry twigs and grass. Can it be that snakes have a repugnance for their 'worn out weeds' that they dislike these mementoes of their fall, and that birds which breed in holes into which snakes are likely to come by instinct select these exuviae as scare-snakes?"

The Flycatchers (*Tyrannidae*) all belong to the widely distributed American genus *Myiarchus*. Of these, the best known is the Crested Flycatcher (*Myiarchus crinitus*). As a boy, I made the acquaintance of this species in eastern Kansas and western Missouri, and later renewed in it central Texas. I was always told that this Flycatcher placed a snake-skin at the entrance to its nesting hollow for the purpose of frightening other animals that might attempt to steal the eggs or young birds. In some cases a long strip of skin hangs down from the inside of the hollow, but in others the slough is used as nest lining. I do not recall having ever found a nest without more or less snake-skin in its make-up. The habit is so well known with this species that mention of it is frequently found in foreign bird books.

The Mexican Crested Flycatcher (*Myiarchus magister nelsoni*) is an abundant bird in the Lower Rio Grande Valley of Texas. Dr. James C. Merrill, in 'Notes on the Ornithology of Southern Texas' (Proc. U. S. Nat. Museum, 1878, pp. 118–173), describes the nest of this species as essentially the same as that of *crinitus*, but that with one exception, no snake-skins were found in the composition of any of the nests. Florence Merriam Bailey (Handbook, p. 252) says that in the nest of this species there is "sometimes snake skin."

The Arizona Crested Flycatcher (*Myiarchus magister magister*) is merely a variety of the last. A nest found by W. E. D. Scott at 4,000 feet elevation in the Catalina Mountains in Arizona (mentioned in Davie's 'Nests and Eggs of North American Birds,' Columbus, Hann, 1889;—I have not seen the original article), was entirely similar to that of *crinitus* "even to the traditional snake skin." According to Mrs. Bailey (Handbook, p. 274), the nest of this species sometimes contains "bits of snake and lizard skin."

Of the Ash-throated Flycatcher (*Myiarchus cinerascens*) Mrs. Bailey, in her 'Handbook' (page 253) says that the nest "occasionally [contains] snake skins." I have only scanty data at hand regarding the nesting of Nutting's Flycatcher (*Myiarchus cinerascens nuttingi*), but its habits are doubtless similar to those of the typical subspecies. It is said to place its nest in old Woodpecker holes in the giant cactus.

My list includes two distinct species and one subspecies of *Fringillidae*. Both the eastern and western varieties of the Blue Grosbeak (*Guiraca caerulea caerulea* and *Guiraca caerulea lazula*), use snake skins in the construction of their nests, and they both breed in the open, in my experience in small thickly foliaged shrubs and bushes, or in thick weed clumps, usually within a height of from eighteen inches to four feet from the ground. The skin is usually woven in with the other nesting material and I have examined specimens in which pieces of slough formed a continuous rim. Rarely a mass of short lengths of cast is matted in with grass to form the base of the nest.

In 1897, Mr. William Winston and I found a nest of the Gray-tailed Cardinal (*Cardinalis cardinalis canicaudus*), in which five short lengths of snake skin were part of its materials, in a small bush along the edge of a mesquite pasture in the western part of the city of Waco. Later a nest found in Gurley Park, three miles south of Waco, was brought in to me. Among the mixture of rootlets, grass and leaves of which it was composed, were two short pieces of skin.

Mr. Charles B. Pearre of Waco, Texas, reports having found a nest of the European House Sparrow in which snake skin was used. I do not include this species in my list for the reason that this was an individual instance, and in any event, a recently acquired habit of an introduced species. The Sparrow might have used the material composing an old nest of either the Crested Flycatcher or Blue Grosbeak.

The three species of the family *Turdidae* represent two subfamilies—two Indian Robins (*Ruticillinae*) and an Old World Warbler (*Sylviinae*). Hume (Nests and Eggs of Indian Birds, Vol. 2, page 72), describes the nidification of the Brown-backed Indian Robin (*Thamnobia cambaiensis* (Latham)), in part as

follows: "The nest varies much in shape, size, and materials, according to situation and locality. When placed in holes, they are usually merely soft, more or less circular, pads of soft grass, with a shallow central depression lined with horse or even human hair, fine roots or vegetable fibres, feathers, cotton, wool, or anything else soft that comes handy, with very frequently scraps of snakes' skins incorporated." The same author (ibid., Vol. 2, pp. 77–79) quotes letters from various correspondents who report finding scraps of snakes' skins in the nests of the Black-backed Indian Robin (*Thamnobia fulicata* (Linn)). *T. cambaiensis* is most abundant in Upper India, while *fulicata* is a typical species of the southern parts of the same country.

With regard to the Rufous Warbler (*Aedon galactodes* (Temminck)), Whitaker (Birds of Tunisia, London, 1905, Vol. 1, p. 74) has the following to say: "The nest is generally placed in a cactus clump, but occasionally in some other thick bush, and as a rule at a height of from one to six feet from the ground. It is loosely built of grasses and rootlets, plentifully lined with wool and very often has a piece of snake skin in it, though with what object this is placed there by the bird it is difficult to say. Possibly it may be for no other reason than that which leads some other birds to introduce bits of rag or similar soft material in their nests, but on the other hand, it is quite possible that the snake's skin may possess some scent or other property that serves to keep off some of the birds' natural enemies."

The single member of the *Troglodytidae* with the habit is the Carolina Wren (*Thryothorus ludovicianus*). I have examined at least a score of the nests of this species. The bird usually nests in woods, either in holes in logs or stumps, or in crevices among rocks. A few breed in old brick-yards and I once found a nest under a house, wedged in between the top of a stone foundation pillar and the floor. One nest found in a strip of woodland on the east bank of the Brazos River, was partially lined with snakes' skins. This was collected by Mr. J. W. Mann. Another discovered by me in a crevice in the rocky bank of a small wet-weather stream, had several pieces of slough in its composition. A third nest, which I found at Dripping Springs on the Brazos River above Waco, Texas, in the hollow of a stump, was lined

with fragments of at least two skins. C. C. Abbott (Naturalist's Rambles about Home, Appleton, 1885, p. 158) mentions finding a nest of this species in the state of New Jersey, which "was largely lined with snake-skins."

Family *Paridae*. It is well known among American ornithologists, especially those who have worked in the western part of Texas, that the Black-crested Titmouse (*Baeolophus atricristatus*) has this selective habit developed to a great degree. In fact, a description of the nest of this species, which usually breeds in old Woodpecker holes, would be incomplete without mention of the "casts."

The above data are all that I have been able to accumulate with reference to the habit of placing snakes' skins in nests, although I have always made note of everything that I have either observed or seen in print regarding it. In my list, there is record of fourteen species and subspecies of birds which have the habit developed to a greater or less degree. It is a usual thing with eight species, i. e., the Bank Mynah, Crested Flycatcher, both of the Indian Robins, the Rufous Warbler, and the Black-crested Titmouse. It is common with the Roadrunner, and perhaps not unusual with the Carolina Wren, Arizona and Ash-throated Flycatchers. The Mexican Crested Flycatcher seems almost to have lost the trait, although it inhabits sections where snakes are abundant.

Eight birds, the Bank Mynah, Black-backed Indian Robin, the four Flycatchers, the Carolina Wren and Black-crested Titmouse, nest in holes. Five, the Roadrunner, the two subspecies of Blue Grosbeak, the Gray-tailed Cardinal and the Rufous Warbler, nest in the open. One, the Brown-backed Indian Robin, usually, but not always, nests in holes. Therefore the ratio is less than two to one in support of Mr. Finn's statement that all birds with this nidification habit breed in holes.

There may be other species which I have overlooked; and some student of bird-behavior may yet make himself famous by writing a thesis offering a more logical explanation of the real bird reason for this bizarre peculiarity, one that might hold water after all of the evidence was in. Birds are supposed by some persons to perform all of their acts instinctively; if this be true, no feathered creature is likely ever to be superstitious, this being a failing con-

fined exclusively to reasoning creatures like the human animal! All of the theories in explanation of the habit require further confirmation before they can be considered in the slightest detail worthy of acceptance. The idea that a lizard is frightened in the presence of a shred of snake slough is not at all in keeping with my experiments with these saurians.

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BIRDS OF GASPÉ COUNTY, QUEBEC.

BY JOHN B. DEMILLE

THE difficulties of travel over the rugged interior of the Gaspè Peninsula have confined activities of ornithologists to the coast line, with its string of small French fishing villages; and to the spectacular breeding colonies of Gannets and Herring Gulls at Percè and Bonaventure Island, located at the southeast tip of the Peninsula. Following a study of the ecology of the sea birds nesting in the vicinity of Percè village by P. A. Taverner[1] in the summer of 1914, the Canada Geological Survey acted on the recommendation of Dr. John M. Clarke[2] by establishing Percè Rock and Bonaventure Island as a Bird Sanctuary.

The breeding group affected by this legislation is one of the largest known on the north Atlantic coast. Those species represented, with approximate census figures are: Gannets (8000), Herring Gulls (3000), Double-crested Cormorants (1300), Murres (1000), Kittiwakes (800), Razor-billed Auks (200), Puffins (75), Leach's Petrels (100). Mr. Taverner[3] has described vividly and with exceptional effectiveness artistically, his visit to the Bonaventure Gannet Ledges; he estimated the total number of birds on that island at 8000. More recently the locality was reported on by the chief taxidermist of the Milwaukee Public Museum,[4] who collected material for the preparation of a display group similar to the excellent Gannet exhibit in the American Museum of Natural History. Frank M. Chapman, who was responsible for the latter work, was among the first to describe the section.[5]

William Brewster, in 1882, was the first ornithologist to enter Gaspè, and published his notes in the 'Proceedings of the Boston Society of Natual History'; five years later the U. S. Fish Commis-

[1] Double-crested Cormorant on the Gulf of St. Lawrence, 'Can. Geol. Sur.,' 1915.
[2] Protection of the Sea Fowl of the Gulf of St. Lawrence. 'VI Ann. Rep't. Commissioner of Conservation, Can.,' 1915.
[3] 'Ottawa Naturalist,' Vol. XXXII, May, 1918.
[4] George Shrosbree, 'Museum Yearbook,' 1922.
[5] Gannets of Bonaventure, 'Bird Lore,' Vol. I, 1899.

sion schooner *Grampus* called at Percè and a few observations made by the National Museum taxidermist, William Palmer, later appeared in the Smithsonian Bulletin No. 819.

The literature of interior Gaspè has chiefly been built up around geological research, in the form of surveyor's and mining reports, two of which are particularly useful to the traveler.[1] [2] The flora which includes various alpine forms characteristic of Labrador, has been studied by Harvard expeditions under the leadership of Prof. M. L. Fernald, over a period covering the last twenty years. A list of birds observed along the Gaspè coast line was published by Dr. C. W. Townsend[3], and represents the pioneer work in describing the avifauna of this least known area of eastern temperate America.

From September 20, to the middle of August 1924, I lived with my wife in a comfortable log cabin situated three miles from the Tabletop Mountains, almost in the center of the peninsula. The cabin was connected with the small village of Mont Louis, on the shore of the Gulf of St. Lawrence, by thirty miles of rough trail. Once a month we walked down to the sea for the mail and stopped there two or three days before returning. Monthly trips were also made to the mountains, which at this point reach the highest elevation in eastern Canada, 4350 feet.

My opportunities for observation were, accordingly, sufficiently varied to give a representative record for the county when to this is added a trip along the coast from Ste. Anne des Monts around to Port Daniel, on the Chaleur Bay side. At this time several days were spent at Riviére Madeleine, Gaspè Basin, and Percè.

Although Gaspè is at a strategic point in the course of migrating birds *en route* to the great breeding grounds to the north, it had not been ascertained whether the line of flight strikes across the peninsula beginning at some point opposite Mingan or Pte. des Monts, on the north shore of the St. Lawrence, or whether it follows along the coast. Neither Dionne[4] nor Macoun[5] refer to this territory.

[1] F. J. Alcock, Geology of Lemieux Township, 'Sum. Rep't., 1921. Can. Geol. Surv.'

[2] A. P. Coleman, Physiography and Glacial Geology of Gaspe, 'Bull. No. 34, Can. Geol. Surv.,' 1922.

[3] 'Canadian Field -Naturalist,' Vol. XXXIV, April and May, 1920.

[4] C. E. Dionne, 'Les Oiseaux de la Province de Quebec,' 1906.

[5] John Macoun, 'Catalog of Canadian Birds,' 1909.

Several records made in the fall of 1923 and the spring of 1924 tend to establish the preferred flight channel as following along the coast, although for the southern migration, particularly, cross-country seemed to be the most advantageous. The river valleys of the Mont Louis and Madeleine form a natural pathway leading southward; and half way across the watershed merges with that of the Cascapedia and Bonaventure rivers, so that by air line Chaleur Bay could be reached by covering a distance of eighty miles. But the birds have evidently overlooked this short-cut, and instead prefer to travel a roundabout way, and by taking the coast line must fly two hundred miles.

In the fall migrating flocks would invariably be flying northward past the cabin, the only ones to take the course I had figured out for them being the Geese and river Ducks. At the sea Passerine species would always be found from ten days to two weeks after they had quitted the vicinity of our camp on the North Branch of the Madeleine River.

The difference in dates of arrival in the spring was even more pronounced. By the middle of June, although plowing had been commenced in the village, two or three feet of snow still covered the ground inland. In the list of species individual cases will be cited to show the number of days taken for a species to appear at the camp after being recorded down at the sea.

It should be mentioned that the first map approaching an accurate survey of the county had not been issued until the present year, 1924. It is printed by the Department of the Interior, Canada, and designated as the Bonaventure sheet. Politically, the Magdalen Islands, lying in the Gulf of St. Lawrence 120 miles off Cape Gaspè, belong with this County; but many authoritative accounts of the birds of this interesting group have been published and they have been omitted from this discussion of the peninsula.

ANNOTATED LIST.

BIRDS OF GASPÉ COUNTY

1. **Gavia immer.** LOON.—The last ones of the year were at Madeleine Lake, Oct. 20. This was a month before ice formed. The ponds opened up again during the first week in June and by the 15th of the month an individual had arrived at one of the four ponds near the cabin.

2. **Gavia stellata.** RED-THROATED LOON.—At Cap des Rosiers, May 23, 1922, Lewis reports seeing one.

3. **Fratercula arctica arctica.** PUFFIN.—Local to Bonaventure Island, where their nests are made in all available hollows and cavities. Shrosbree describes his method of capturing them, by throwing a fishnet over the hole opening so the birds would be entangled like so many herrings.

4. **Cepphus grylle.** BLACK GUILLEMOT.—To be seen in pairs and small flocks all along the coast. They are known to the French as *Pigeons de mer* and frequently taken for the pot. The birds are unsuspicious and dive rather than fly when approached. With the exception of the Herring Gulls these are the most common of the water birds locally distributed.

5. **Uria troille troille.** MURRE.—At Bonaventure together with a few pairs of the next species. These and the Petrels are the first to leave the Ledges, about the last week of August; after that time only a few stragglers are to be found in the vicinity.

6. **Uria lomvia lomvia.** BRÜNNICH'S MURRE.

7. **Alca torda.** RAZOR-BILLED AUK.—Local at Bonaventure. At the end of the nesting season the birds congregated in flocks of twenty or thirty, and by their odd coloring and rapid, direct manner of flight they stood out in marked contrast to the endlessly circling Gannets.

8. **Alle alle.** DOVEKIE.—A small flock in Mont Louis Bay, Dec. 27, during a severe storm. Ice had not yet formed in the open sea.

9. **Rissa tridactyla tridactyla.** KITTIWAKE.—Evenly distributed between Percé Rock and the Ledges on Bonaventure. Occasionally to be seen along the coast.

10. **Larus hyperboreus.** GLAUCOUS GULL.—Three birds identified during the winter at the village. Reported at Gaspé by Lewis in December. A common breeder on the southern coast of Labrador.

11. **Larus marinus.** GREAT BLACK-BACKED GULL.—At Mont Louis in September and along the coast not uncommonly during the summer, accompanying the next species.

12. **Larus argentatus.** HERRING GULL.—Besides being the most widely distributed of sea fowl these birds have come to be closely associated with the lives of the people who inhabit the towns strewn along the bleak north shore. Just as they are known as valuable scavengers among harbors of commerce, so here they are depended on by the fishermen for the disposal of debris scraped from the cleaning tables along the beach. The distinctive architecture of the French *habitant* will signify his love of the picturesque, and quite aside from its economic value *le Goéland* is admired for its graceful wings and the cries of unrestrained excitement.

One early morning I went with a cod fisherman out to the banks off Rivière Pierre. The boat was no sooner anchored than several Gulls took their places astern with the familiarity of old acquaintance; and as the four lines were baited I realized what their inducement was. Herrings taken the night before in nets were cut into small pieces for the hook and then heads and backbones were thrown to the birds astern. Each tidbit

was the signal for mad scrambling and the victor would snatch it up as it touched the water. They were shy of a stranger, my companion said, or he would have them perching on the gunwales and fairly eating the scraps from his fingers. During the long morning, from daylight until noon, of the fishing season, each boat entertains its coterie of Gulls; it may be that from one season to the next the same ones return to the former friendships.

In contrast to this attitude may be mentioned the practice of Newfoundland fishermen in capturing fledgling Gulls and raising them as poultry. After fattening them on a diet chiefly of fish the coast fishermen are satisfied, instead of the conventional turkey, with one of his home-raised Gulls for the holidays.[1]

The St. Lawrence coast of Gaspé has been settled for only forty years, and yet I was often surprised by the evidences of comfort and happiness everywhere shown. Their tastes of the inhabitants are simple in many respects, but they are able to vary the universal pork diet of winter in so many ingenious ways as to make their meals models of the culinary art. Between villages there is neither telephone nor automobile communication, and except during the four months of navigation travel must be accomplished with their shaggy, fragile looking "French Ponies," which are accustomed to the steep and difficult road.

13. **Larus philadelphia.** BONAPARTE'S GULL.—In September about a dozen were flying over the water of Mont Louis Bay, and were recorded again the following May. Due to the absence of islands along the north shore of the Peninsula most of the sea birds nesting in this latitude (49° N) go farther up the river beyond Green Island, or cross to the Labrador shore, distant seventy miles.

14. **Sterna hirundo.** COMMON TERN.—During the first week of June, after a lapse of three weeks from the last of the great flights of Gulls up the coast, this species became the common bird of passage, the flocks extending as far out over the water as the eye could see.

15. **Sterna paradisæa.** ARCTIC TERN.—Migrating flocks common all along the coast during spring and fall.

16. **Chlidonias nigra surinamensis.** BLACK TERN.—Not common, but undoubtedly a regular traveler in the region. A flock of ten off Ste. Anne des Monts, Sept. 18, 1923; also at Port Daniel, on Chaleur Bay, Sept. 2, 1924.

17. **Oceanodroma leucorhoa.** LEACH'S PETREL.—Common on Bonaventure, where it nests in holes above the Gannet Ledges. Duval told me the few fishermen living there never did any hunting on the Island, although two-thirds of the area is densely covered with spruce and fir. It is evident that foxes have taken advantage of such security and prey heavily on Petrels, Puffins and other birds nesting at the top of the cliffs. I came on a fox one evening in the act of stalking, and Shrosbree found one enjoying a meal.

[1] Capt. J. W. Collins, Rept. U. S. Fish Commission, 1882.

18. **Moris bassana.** GANNET.—Although nesting only three miles from the mainland, all except occasional individuals kept out to sea for their food. In curious contrast were the Herring Gulls that nested on Percé Rock, a few hundred feet off shore. They seemed to divide their time impartially between land and sea, and at any time during the day small companies of the Gulls would be lined up along the ridge pole of some house roof, on a fence rail or standing about in the fields.[12]

19. **Phalacrocorax auritus auritus.** DOUBLE-CREASTED CORMORANT.—In addition to the large colony nesting on the flat summit of Percé Rock these birds breed in several locations in the vicinity of Gaspé Bay; small birches take the place of the usual rock ledges as the nesting site at Three Runs. Other notable sections are the Bon Ami cliffs and the coast near Mt. St. Albans. Ten years ago the Dominion government was prevailed upon by wealthy salmon interests to issue orders for the extermination of the Gaspé Cormorants. When action was suspended as a result of Taverner's report on conditions, public opinion was so hostile that, until the Sanctuary was decreed, the Cormorant colony was threatened with public execution.

Fred Richmond, who lives in the village of Gaspé Basin, told me what he thought of the whole Cormorant family in a way that expresses the sentiment of most of the natives on the subject. God no doubt had his reasons for creating each living thing, he said, but when he made the Cormorant he did himself little credit.

20. **Mergus americanus.** MERGANSER.—A pair on one of the four North Branch Ponds near camp, Oct. 4. *M. americanus* and *serrator* and the Hooded Merganser have been given the French name *Bec-scie.* I made no observation of this latter species, but from descriptions of the bird given me by a man in Mont Louis and another in Grande Vallée it is evidently to be found in the County.

21. **Mergus serrator.** RED-BREASTED MERGANSER.—Six on Madeleine Lake, Oct. 20; the next day one was seen flying south along the Madeleine River. These may migrate south across the Peninsula but the spring route is along the coast. May 4 a small flock seen going up the Mont Louis River from the sea. Several hundred nest on rock islands 100 miles east of the city of Quebec.

22. **Anas rubripes.** BLACK DUCK.—Common during October on inland ponds. Mallards apparently keep to the interior westward, avoiding Gaspé entirely. They have been reported, however, as breeding and plentiful on the southeast Labrador coast.[13]

23. **Spatula clypeata.** SHOVELLER.—At Quebec, according to Dionne, this is an occasional visitant. Although I saw none Taverner reports an individual taken near Gaspé in June, 1915; he also found a mounted specimen of the next species, shot near Gaspé Basin.

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[12] For a detailed account of this species see paper by Lucas, 'The Auk,' April, 1888.

[13] L. M. Turner, Birds of Labrador, Proc. U. S. Natl. Mus., 1885.

24. **Aix sponsa.** WOOD DUCK.

25. **Clangula clangula americana.** GOLDEN-EYE.—Between April 10 and 18 several flocks seen along the coast on the way from Mont Louis to Ste. Anne des Monts. At this time the St. Lawrence was filled with floating ice and a strip a quarter of a mile wide was still frozen along the shore.

26. **Clangula islandica.** BARROW'S GOLDEN-EYE.—A migrating flock at Mont Louis, April 20. These, in company with large numbers of Scoters, breed in the St. Lawrence on rocky islands near the base of the Peninsula. When visiting these islands by canoe the 9th of July most of the eggs were hatched. The birds resented intrusion more emphatically than the Gannets at Bonaventure; and probably because of the easy accessability, their nests were often plundered by men from the mainland.

As the canoe approached one of the islands a reconnoitering flock would fly out to investigate; after circling overhead they would return and give the warning. All the birds on the island flew up simultaneously as the canoe touched shore; their harsh cries made a deafening noise while they wheeled about in great excitement. Then as the canoe pushed off a small flock would carry warning to the next island, and the same reception would be waiting for us when we drew near.

27. **Harelda hyemalis.** OLD SQUAW.—Two flocks passed Mont Louis April 20; common along the coast in the fall. Lewis found numbers off Bonaventure Island during December.

28. **Histrionicus histrionicus.** HARLEQUIN DUCK.—On April 21 a small flock was recorded at L'Anse Pleureuse, the next village east of Mont Louis. Taverner found a dozen or more unsexed birds near Bonaventure.

29. **Somateria dresseri.** EIDER.—These pass across the tip of the Peninsula by the hundreds and are considered the favorite game bird. The prefered season for shooting them is the spring. The birds settle in large numbers on the ice around open water and can be killed with so little trouble the natives think it a shame to miss the fun.

30. **Oidemia americana.** SCOTER.—This and the two following species migrate in considerable numbers along the coast. In April, long strings of the birds would be seen out over the open St. Lawrence, beyond the shore ice. They are among the earliest arrivals. The next species is the more abundant.

31. **Oidemia deglandi.** WHITE-WINGED SCOTER.

32. **Oidemia perspicillata.** SURF SCOTER.

33. **Branta canadensis canadensis.** CANADA GOOSE.—A cross-country migrant. Flocks ranging in size from 10 to 30 birds were passing over camp almost daily during the month of October. The first to return in spring were seen over Mont Louis Lake, fifteen miles inland, flying north during a heavy snow storm April 26.

34. **Branta bernicla glaucogastra.** BRANT.—These and White-winged Scoters are probably the most abundant transients along the coast

during April and October. A group of almost a hundred birds settled on the open water off Rivière à Claude for the night of April 15.

35. **Botaurus lentiginosus.** BITTERN.—At Newport and Grand River on Chaleur Bay, a number on mud flats at river outlets. On a small island off Newport, where we camped one night, 20 or more were found roosting in the trees.

36. **Ardea herodias herodias.** GREAT BLUE HERON.—During the year I had no experience with Herons inland. They kept strictly to the coast; it is possible heronries would be found in the south shore district. On that side the land is in sharp contrast with the St. Lawrence coastline, being for the most part low and gently sloping. The rivers are longer, emptying into Chaleur Bay, and behind the barachois (gravel bar) at the mouth, they broaden out to form an extensive shallow backwater of the sea. Wherever these were passed Great Blue Herons, Bitterns and the next species would be seen feeding. Aug. 20 from a canoe at the base of Percé Rock I saw three Herons perched on the edge of the barren plateau, while Cormorants and Gulls scurried back and forth caring for late nestlings.

37. **Nyticorax nyticorax nævius.** BLACK-CROWNED NIGHT HERON.—Aug. 10 on the small tidal flats of the Mont Luis River I saw ten birds wading about in the shallow water; in larger numbers than the preceding species around the coast.

38. **Phalaropus fulicarius.** RED PHALAROPE.—One of the mackerel fishermen at Port Daniel told me this was called "sea goose"; during August it was found on the Miscou Banks in large numbers. I saw a flock of about thirty off Bonaventure, swimming about in calm water between tide-rips.

39. **Lobipes lobatus.** NORTHERN PHALAROPE.—At Grand Etang, Aug. 17 a large flock, and more seen from the canoe off Bonaventure five days later.

40. **Pisobia minutilla.** LEAST SANDPIPER.—May 9 on mud flats of the Mont Louis River I saw three in company with Greater Yellow-legs.

41. **Ereunetes pusillus.** SEMIPALMATED SANDPIPER.—A pair on the beach at Grand Etang, Aug. 17, and at Mont Louis, May 8.

42. **Calidris leucophaea.** SANDERLING.—Just after the ice in Mont Louis Bay had broken up, on April 18, a flock of about twenty was feeding along the beach.

43. **Totanus melanoleucus.** GREATER YELLOW-LEGS.—May 9 and 15 at Mont Louis, and in August at the mouth of the York and Grand Pabos Rivers.

44. **Tringa solitaria solitaria.** SOLITARY SANDPIPER.—From the middle of June to the first of August these were to be found on practically every pond inland. I was surprised to find this and the next species the only ones of the family nesting there, with every condition so favorable.

45. **Actitis macularia.** SPOTTED SANDPIPER.

46. **Numenius hudsonicus.** HUDSONIAN CURLEW.—A pair at Fox River, Aug. 18.

47. **Pluvialis dominicus donimicus.** GOLDEN PLOVER.—Sept. 28 and 30 I saw three birds just below the summit of Dunraven, the highest of the Tabletop Mts., fairly good evidence they were taking the inland route over to Chaleur Bay. Two flocks of the next species were recorded at Douglastown by Dr. Townsend.

48. **Squatarola squatarola.** BLACK-BELLIED PLOVER.

49. **Charadrius semipalmatus.** SEMIPALMATED PLOVER.—This and the next species I found locally distributed all around the coast, feeding by twos and threes on the gravel beaches.

50. **Charadrius melodus.** PIPING PLOVER.

51. **Arenaria interpres morinella.** RUDDY TURNSTONE.—A small flock on the shore of Mont Louis Bay, April 20.

52. **Canachites canadensis canace.** CANADA SPRUCE PARTRIDGE.—Common all through the interior to within eight miles of the coast. During the winter the birds stayed in the upper branches of spruce and fir trees and were easily overlooked, but unlike the semi-migratory habits of the Ruffed Grouse the range did not shift perceptibly winter and summer.

Mating began the first of June. The colors of the male are the most striking of the winter birds, and this quality adds to the interest of watching the courtship. They are so tame it is sometimes possible to catch them with the hand, yet in shielding their young they are more courageous than the warier Grouse.

On July 10, near Mont Louis Lake, I found four broods along the trail to the village. The young were able to fly sufficiently for protection but each mother was so solicitous that she flew almost into my face while I stood in the vicinity of her chicks. As I walked on she would scuttle down the trail ahead, and then watch me from the bushes until her fears were satisfied.

53. **Bonasa umbellus togata.** CANADA RUFFED GROUSE.—Rarely found in the heavy forest of the interior, but plentiful on the village outskirts and back about ten miles from the sea. The first of January marked their first disappearance; none seen then until April. The first drumming was heard May 20 near Mont Louis Lake. Young were seen the last of June near the village. The climate down at the sea was about two weeks later than at North Branch Camp.

54. **Lagopus rupestris rupestris.** ROCK PTARMIGAN.—The record established by Shrosbree, is unique for Gaspé. He collected a single bird on Bonaventure Island in July, 1922.

55. **Circus hudsonius.** MARSH HAWK.—Individuals seen frequently over the interior during the summer months.

56. **Accipiter velox.** SHARP-SHINNED HAWK.—June 3, while making the last trip from Mont Louis Lake to North Branch with the dog-sled (the snow was between two and three feet deep in the trail), a female perched on a nearby spruce and gave its shrill whistle.

57. **Accipiter cooperi.** COOPER'S HAWK.—Nov. 2 on the south slope of McNab Mt. I walked to within fifty feet of one resting on the point of a low spruce. A few in summer along the coast.

58. **Astur atricapillus atricapillus.** GOSHAWK.—One was seen soaring over the valley east of Dunraven, May 2. Another along the portage road between Fox River and Gaspé Basin.

59. **Buteo borealis borealis.** RED-TAILED HAWK.—Common in summer between Mont Louis Lake and the sea.

60. **Buteo platypterus.** BROAD-WINGED HAWK.—On March 20, while breaking trail about a mile below camp, with the snow seven feet deep, one of these birds flew past and lit on a tall spruce. After watching me curiously until I had passed, it went on, flying northward. This point was near the divide between the watersheds of the Madeleine and Mont Louis Rivers; the Hawk was accordingly migrating up the valley of the North Branch following this course.

As pointed out before, the cross country route is the more difficult one in the spring because snow lingers until the last of June, and this will account for records of such strong winged birds as the Canada Goose, Loon, river Ducks and several of the Hawks, while the other species circle the Peninsula.

This Hawk was common during the summer. Two nests were located, one built in a white pine (a rare tree in Gaspé); and the other, nine miles up the Mont Louis River in the crotch of a yellow birch, forty feet above the ground.

61. **Archibuteo lagopus sancti-johannis.** ROUGH-LEGGED HAWK.—On May 2 one was seen soaring over the north shoulder of Dunraven, near enough for distinguishing the black tail-tip.

62. **Haliæetus leucocephalus alascanus.** NORTHERN BALD EAGLE.—One over Black Lake, three miles from camp, July 1. Townsend saw four in immature plumage at Cross Point, July 7, 1919.

63. **Falco peregrinus anatum.** DUCK HAWK.—A pair above sea cliff west on Mont Louis Bay, June 1. Reported at Percé as probably breeding.

64. **Falco columbarius columbarius.** PIGEON HAWK.—Oct. 11, one passed close to me flying low over a thicket of stunted spruce on an elevated ledge of Tabletop. Common on the coast.

65. **Falco sparverius sparverius.** SPARROW HAWK.—Aug. 31, while walking the railroad near Gascons, on the south shore, a bird darted into the bushes at the side of the track just ahead. I was able to get close without being seen and was surprised to discover him standing on the ground waiting beside a mouse hole, in the manner of a cat. The bird stayed a minute or two and then hopped to an opening in the undergrowth. He flew away emptly handed. Not uncommon all around the coast.

66. **Pandion haliaëtus carolinensis.** OSPREY.—From Fox River around the south shore these were common.

67. **Strix varia varia.** BARRED OWL.—March 15, I came unexpectedly on a bird roosting on a low spruce, in the valley below Tabletop.

68. **Scotiaptex nebulosa nebulosa.** GREAT GRAY OWL.—The breeding range of this species possibly extends to the north shore of Gaspé. I happened to notice a large bird high up in a spruce growing beside the road near Rivière Madeleine, while walking from that village to Grande Vallée on Aug. 16. It gave me leisure to make the identification and refused to fly until a stick was thrown. Unfortunately I had no gun at the time.

69. **Cryptoglaux acadica acadica.** SAW-WHET OWL.—At one of the North Branch Ponds, Oct. 4 one was heard calling. Dr. Phillips reported a pair at the forks of the Cascapedia River in 1922.

70. **Bubo virginianus virginianus.** GREAT HORNED OWL.—From March 15 until the end of May heard frequently at North Branch. A pair at Mont Louis Lake and called Oct. 20 at Madeleine Lake.

71. **Surnia ulula caparoch.** HAWK OWL.—A pair flying north perched on tops of spruce trees near the trail late in the afternoon of Feb. 17, half-way between camp and Mont Louis Lake. After watching me a minute they exchanged calls and took flight.

72. **Ceryle alcyon alcyon.** BELTED KINGFISHER.—Just after sunrise Oct. 4 one flew down North Branch River, giving its challenging cry. The first one in the spring was at the mouth of the Mont Louis River May 15, and later in the day was seen three miles upstream. June 5 one passed by the cabin, going south down the North Branch.

73. **Dryobates villosus leucomelas.** NORTHERN HAIRY WOODPECKER.—A common resident.

74. **Dryobates pubescens medianus.** DOWNY WOODPECKER.—Resident, but less common than the Hairy. Found in the mountains up to an elevation of 3000 feet.

75. **Picoides arcticus.** ARCTIC THREE-TOED WOODPECKER.—Resident and common all through the interior.

76. **Picoides americanus americanus.** THREE-TOED WOODPECKER.—Resident and common. Like the preceding, this species prefers the mountains and the dense vegetation of the inland region, from Mont Louis Lake back. The ravages caused to spruce by insect blights evidently explain the presence of large numbers of Woodpeckers.

77. **Sphyrapicus varius varius.** YELLOW-BELLIED SAPSUCKER.—This, the Flicker and Hairy are the common species along the coast, where, being north of the tree limit so far as orchards are concerned, they are obliged to turn their efforts to the maple, ash and birch.

78. **Phlœotomus pileatus abieticola.** NORTHERN PILEATED WOODPECKER.—One near Mont Louis Lake, June 4.

79. **Colaptes auratus luteus.** NORTHERN FLICKER.—Last record in the fall, Sept. 24. One arrived at Mont Louis, April 20, three days later seen seven miles back at the river forks. At Mont Louis Lake, May 18. The cabin at the forks had been riddled with shallow holes, and one morning we were at a loss to explain a loud rattling noise until I investigated and found a Flicker hammering away on one of the logs beside the door. The cabin had been built of white cedar.

80. **Antrostomus vociferus vociferus.** WHIP-POOR-WILL.—A pair heard calling across one of the North Branch Ponds, Sept. 25.

81. **Chordeiles virginianus virginianus.** NIGHTHAWK.—None seen on the north shore, but at Percé and Newport a pair Aug. 24 and 25, respectively.

82. **Chaetura pelagica.** CHIMNEY SWIFT.—Although reported as rare on Anticosti Island, sixty miles off the coast in the Gulf, they are common all along the north shore. June 18 several flew over the Mont Louis River at the forks and the next day a flock of about 25 was flying over a field two miles above the last house in the village. It was late in the day and I watched to see where they would go. After wheeling about in massed formation they suddenly disappeared into the hollow top of a dead poplar. The stub had a diameter of three feet and stood about thirty feet high.

As I approached, the alarm was given and they all came pouring out. They kept up an excited twittering until I had gone. The hollow stub was only a few yards from the river, standing on the side of a much worn deer trail.

83. **Archilochus colubris.** RUBY-THROATED HUMMINGBIRD.—One at Gaspé Basin, Aug. 21. Said to be common in the many beautiful gardens of the village.

84. **Sayornis phœbe.** PHŒBE.—Two pairs nesting, one under the bridge two miles up the Mont Louis River; the other at L'Anse Pleureuse.

85. **Tyrannus tyrannus.** KINGBIRD.—One seen at Grand River, Aug. 25.

86. **Nuttallornis borealis.** OLIVE-SIDED FLYCATCHER.—A pair at Mont Louis and others at St. Antoine and along the south shore.

87. **Empidonax flaviventris.** YELLOW-BELLIED FLYCATCHER.—An individual in bushes bordering marshy ground along the Mont Louis River five miles back from the coast, July 6.

88. **Empidonax trailli alnorum.** ALDER FLYCATCHER.—With the temperature two degrees below freezing a pair passed down the North Branch River on Oct. 5, feeding in alder bushes opposite the cabin. May 6 and 12 an individual near the village.

89. **Otocoris alpestris alpestris.** HORNED LARK.—The Tabletop Mts. lie ten miles east of Mt. Albert, where a breeding colony of these birds and Pipits has previously been discussed by Townsend.[1] On my first visit to Dunraven, the highest peak of Tabletop, I counted forty birds, most of them in pairs. This was Sept. 27; ten days later the mountains were covered with snow and I found only a single pair. A small flock passed over the cabin Oct. 29, the last to be seen until March 16, when a small flock flew north up the river past camp.

Ten pairs were found on Tabletop June 28; although the weather was bad nest building had evidently begun. Several flight songs were heard, in so wild a setting a very beautiful sound. The male flies straight upward for

[1] Townsend, A Breeding Station of the Horned Lark and Pipit, 'The Auk,' Jan., 1923.

fifty or a hundred feet as the song begins, then flutters a second as he hangs suspended, and drops sudddenly to the ground with the song's conclusion.

90. **Cyanocitta cristata cristata.** BLUE JAY.—Only occasionally reported. I saw one at Rivière Madeleine Aug. 13 and heard of them at Ste. Anne des Monts and Percé. Anderson found one as far inland as Lake Ste. Anne.

91. **Perisoreus canadensis canadensis.** CANADA JAY.—Common all through the interior. Two pairs were regularly at the door yard in the early mornings winter and summer. In stormy weather they were about the cabin most of the time and during the long months of isolation they endeared themselves to us by their companionship. A description of some of their interesting ways will be found elsewhere.[1]

Nesting began the last week of April, the nest being located in a spruce growing in swampy ground a quarter-mile from camp. June 8, three fledged young were brought to the cabin by the parents. Three in juvenal plumage were seen in the wooded area of Bonaventure Island.

92. **Corvus corax principalis.** NORTHERN RAVEN.—Reported by Taverner preying on Herring Gull nest at Percé. Although only as casuals were they to be seen along the coast, inland they were one of the common residents. One came to our camp to feed on scraps, Sept. 26, and frequently afterward. A pair was regularly at Mont Louis Lake, but on Tabletop they congested in a flock of as many as fifteen individuals. In the fall and summer I expected to find bears attracted by the carcasses of my caribou, but Ravens invariably had the bones picked clean in two or three days.

93. **Corvus brachyrhynchos brachyrhynchos.** CROW.—Absent between the middle of December and March 24. Mating had started the first of May. In July, after nesting, large flocks settle on the beach and eat the refuse left in cleaning the cod fish. At Mont Louis their numbers were about two hundred; the only flock exceeding this in size was at Chloridormes.

94. **Dolichonyx oryzivorus.** BOBOLINK.—Reported as fairly common on the south coast in hay meadows, by Anderson. One pair was seen outside the village of Newport.

95. **Molothrus ater ater.** COWBIRD.—An individual near Chandler. Townsend saw one in immature plumage at Grande Grève.

96. **Agelaius phœniceus phœniceus.** RED-WINGED BLACKBIRD.—A pair nesting in swamp willows two miles up the Mont Louis River. Bell, accompanying Sir William Logan on one of the trips of exploration, mentions seeing one at Ste. Anne des Monts, July 17, 1858.

97. **Sturnella magna magna.** MEADOWLARK.—One seen near Percé by Taverner in June 1915.

98. **Euphagus carolinus.** RUSTY BLACKBIRD.—An individual reported by Keays at Mont Louis Lake, Oct. 2. The first to appear in

[1] A year's friendship with the Canada Jay, 'Bird Lore,' April, 1925.

spring stopped at camp April 30. It perched on a stump and repeated its squeaky note, and then flew down stream. Having come from the river valley north it was evidently migrating along the coast. June 16, a pair nesting in alders two miles below camp. Three days later one was found in low meadow land along the Mont Louis River.

99. **Quiscalus quiscula aeneus.** BRONZED GRACKLE.—Oct. 16 about fifty, making a loud commotion, settled for the night in bushes two miles above the village. May 5, a large flock in poplars near one of the Mont Louis houses. Common and nesting there June 18.

100. **Pinicola enucleator leucura.** PINE GROSBEAK.—On the afternoon of Oct. 27 a pair lit in trees near the cabin and after calling several times flew off down the river. Nov. 3, I found three among stunted spruce on the south slope of McNab Mt. Dec. 28, a flock of 11 feeding on spruce "browse," half way between camp and Mont Louis Lake. They were also seen during March and April.

101. **Carpodacus purpureus purpureus.** PURPLE FINCH.—These are present all winter at Montreal, but the first to arrive at Mont Louis were in a field above the village May 24, just after the snow had disappeared. They were singing from bare birches and moving restlessly from point to point. July 8, a pair nesting at Mont Louis Lake, the male in full song. Five days later common along the North Branch River.

102. **Loxia curvirostra minor.** RED CROSSBILL.—Several at Mont Louis and L'Anse Pleureuse the last week of July.

103. **Loxia leucoptera.** WHITE-WINGED CROSSBILL.—This and the preceding species are common breeders near the coast. A flock numbering about fifty at Mont Louis, July 9. Taverner saw more than a hundred at Percé about this time in 1914.

104. **Acanthis linaria linaria.** REDPOLL.—From April 20 to March 24, flocks varying in size from 50 to 200 were seen wherever fields had been swept clear of snow by the prevailing northwest winds. At this time my wife and I made the 80-mile round trip from Mont Louis to Ste. Anne by sleigh, and at each village along the way these delicately colored birds would greet us from the gable of some curving roof. The hardy folk sat comfortably by their stoves and gave possession of their mountain-bordered valleys to these merry songsters.

105. **Astragalinus tristis tristis.** GOLDFINCH.—A flock of twelve in a barley field one mile up the Mont Louis River, May 31. Common between the village and forks, July 10.

106. **Spinus pinus.** PINE SISKIN.—Small flock feeding in tall trees on trail to Tablètop, Sept. 25. About twenty in poplars four miles above the village, May 12 and June 1. Nest with eggs found by Taverner at Gaspé Basin, July 21.

107. **Calcarius lapponicus lapponicus.** LAPLAND LONGSPUR.—April 14, a flock of twenty on exposed ground in snow-covered field five miles above the village. May 2 and June 6 several on Dunraven.

108. **Poœcetes gramineus gramineus.** VESPER SPARROW.—Sept. 24

ten were seen in a field of oats on the village outskirts. Reported from Ste. Anne des Monts and Rivière Madeleine in the month of July by Townsend.

109. **Plectrophenax nivalis nivalis.** SNOW BUNTING.—On Nov. 2, I found a flock of more than a hundred flying from place to place on the snow-covered summits of Dunraven and McNab, picking shriveled crowberries where they were exposed. Small flocks were seen along the coast during the first two weeks of April.

110. **Passerculus sandwichensis savanna.** SAVANNAH SPARROW.—May 6, a flock of about 30 in open fields near Mont Louis. Common up to timber line in the mountains, after the middle of June. The first of July a nest was found on the northeast shoulder of Dunraven. The materials were sphagnum moss, coarse grass, bits of ground blueberry stalks and lined with white caribou hair. It was placed under a granite boulder surrounded by dwarf spruce.

111. **Zonotrichia leucophrys leucophrys.** WHITE-CROWNED SPARROW.—On May 20, we reached Mont Louis Lake at seven o'clock in the morning, having traveled with the dog sled since midnight from North Branch to avoid the softened snow that came with the heat of the sun. One of these birds was picking ravenously over a small patch of bare ground in front of the cabin when we arrived and spent the whole day, being joined from time to time by several White-throats.

112. **Zonotrichia albicollis.** WHITE-THROATED SPARROW.—Sept. 27, a bird in song at the foot of Dunraven. At camp the last migrant was seen Oct. 17. Three songs heard at the village May 10 and common two days later. At the forks May 14; a week later at Mont Louis Lake. June 1 at North Branch their jubilant song gave us confidence the snow would soon be gone. July 16 a brood of fledged young was found near camp.

113. **Spizella monticola monticola.** TREE SPARROW.—A small flock at Rivière à Claude April 18.

114. **Spizella passerina passerina.** CHIPPING SPARROW.—Sept. 27 about twenty on the eastern slope of Tabletop. June 19 and later common in the village and along the coast.

115. **Junco hyemalis hyemalis.** SLATE-COLORED JUNCO.—Late migrants near Mont Louis Lake, Oct. 1. First spring arrivals at camp April 28, a pair feeding at the cabin door during the afternoon. Cross country migration suggested by entire absence the day before at Mont Louis Lake, the only route from the St. Lawrence at this point. After June 1 common everywhere. Nest with four eggs found June 18 at a point on the trail twelve miles back from the sea. The nest was curiously lined with small quills of the procupine, one of the most abundant of the mammals in this country. These young were fledged the first week in July. July 12, a nest was located near camp, three weeks after the disappearance of snow. In the village at this time Juncos were beginning the second brood.

116. **Melospiza melodia melodia.** SONG SPARROW.—The last one

seen at camp on Oct. 15. Several songs on the trail near the village May 5. At the forks May 17. None found farther inland.

117. **Melospiza lincolni lincolni.** LINCOLN'S SPARROW.—May 6 a small flock in field a mile above the village. A pair with fledged young in low tamaracks at pond behind camp July 13.

118. **Melospiza georgiana.** SWAMP SPARROW.—Within a radius of two miles around the camp I located seven ponds. They varied in length from two hundred yards to half a mile, each of them shallow and with marshy borders. The extent of local glaciation in this upland region between the high range of the Shickshock Mts. and the St. Lawrence resulted in a wide distribution of bogs and dammed water courses. Intervening mudholes between ponds contributed to the difficulties of travel, and incidentally offered all kinds of insects a place to breed in distressing abundance.

In accordance with such characteristics of the country Swamp Sparrows are commonly distributed. The first nest was found near camp June 15.

119. **Passerella iliaca iliaca.** FOX SPARROW.—Seven inland only during the fall migration, three near Tabletop Oct. 18. Occasionally along the coast in August.

120. **Passer domesticus.** ENGLISH SPARROW.—Absent between Oct. 2 and May 10. Found in door yards all along the coast.

121. **Petrochelidon lunifrons lunifrons.** CLIFF SWALLOW.—Several over the Mont Louis River June 19. A month later fledged young in nests in the village.

122. **Hirundo erythrogastra.** BARN SWALLOW.—While less common than the preceding, several were always to be seen flying over the river.

123. **Iridoprocne bicolor.** TREE SWALLOW.—Just before dark on June 15 a lone bird was darting and sailing over the trees across the river from camp. Two weeks later another came and July 5 there were five flying over the cabin. They were attracted by a caribou skin I had drying on the wall of the wood house and each would come down in turn and pull off a tuft of hair. I never located their nests but they evidently were near one of the ponds behind our camp.

124. **Riparia riparia.** BANK SWALLOW.—At least two pairs nested in a fifty-foot sand bank where the river cut the base of one of the marine beaches in the village.

125. **Bombycilla cedorum.** CEDAR WAXWING.—A pair at St. Yvon Aug. 15. Taverner saw a few at Percé.

126. **Lanius borealis.** NORTHERN SHRIKE.—May 9 one perched in a treetop at the edge of the woods, two miles below the forks of the Mont Louis River. Near Mont Louis Lake on July 12 I located a bird by its loud whistling. Lewis saw one on Bonaventure Island, Dec. 10.

127. **Vireosylva olivacea.** RED-EYED VIREO.—A pair seen in a large poplar tree a mile above camp, June 16. After the 20th they were common between the forks and Mont Louis.

128. **Vireosylva philadelphica.** PHILADELPHIA VIREO.—This and

the following species reported common along the coast by Townsend. I had seen none until I reached Little Pabos, on the south side of the Peninsula, the last of August. In a small grove of willows at this place there was a flock which included a dozen or more Vireos and two or three Black and White Warblers.

129. **Lanivireo solitarius solitarius.** BLUE-HEADED VIREO.

130. **Vireo griseus griseus.** WHITE-EYED VIREO.—A breeding pair found July 23 near the large lake at L'Anse Pleureuse.

131. **Mniotilta varia.** BLACK AND WHITE WARBLER.—One near the forks July 9, and the 13th I saw one across the river from camp.

132. **Vermivora peregrina.** TENNESSEE WARBLER.—The last of June on the trip from camp to the village this was found to be the common warbler all along the trail. The birds showed preference for the birches that were scattered sparsely through the coniferous woods.

133. **Compsothlypis americana usneae.** NORTHERN PARULA WARBLER.—One passed camp June 28, fluttering from bush to bush on the opposite side of the river as he made his way up stream.

134. **Dendroica tigrina.** CAPE MAY WARBLER.—At Gaspé Basin three birds were seen in an elm tree, the latter part of August.

135. **Dendroica æstiva æstiva.** YELLOW WARBLER.—Several pairs nesting in bushes bordering the Mont Louis River. Common at Grande Vallée.

136. **Dendroica cærulescens cærulescens.** BLACK-THROATED BLUE WARBLER.—An individual seen by Townsend in 1919 at Grande Grève; three years later another recorded there by Lewis.

137. **Vermivora rubricapilla rubricapilla.** NASHVILLE WARBLER.—Not uncommon at several towns along the shore, Rivière Madeleine, Grand Etang and Fox Rivers.

138. **Dendroica coronata.** MYRTLE WARBLER.—Several of this species, together with Juncos and a single Brown Creeper reported by Keays alighting on the rigging of the SS. *Gaspesia* during a heavy fog off Ste. Anne des Monts, Sept. 22. A small flock in alders bordering the Mont River, May 15. Six days later individuals were seen at Mont Louis Lake and the last of the month a pair at North Branch. The common Warbler.

139. **Dendroica magnolia.** MAGNOLIA WARBLER.—June 10 a pair in spruce trees near camp; frequently seen along the trail.

140. **Dendroica castanea.** BAY-BREASTED WARBLER.—An individual in birch tree at the forks, June 24.

141. **Dendroica striata.** BLACK-POLL WARBLER.—Several in spruce near Mont Louis Lake, May 16. A month later one was seen near camp.

142. **Dendroica fusca.** BLACKBURNIAN WARBLER.—These and Black-polls were sometimes found migrating along the coast the last of August. A pair at one of the North Branch Ponds, July 2.

143. **Dendroica virens.** BLACK-THROATED GREEN WARBLER.—None inland but found at Chlorydormes and several points on the south shore.

144. **Dendroica palmarum hypochrysea.** YELLOW PALM WAR-

BLER.—One reported by Taverner at Percé, June 10, 1915. No other records.

145. **Seiurus aurocapillus.** OVEN-BIRD.—A song at the forks June 20 and two days later a bird was seen. Another near Mont Louis Lake.

146. **Seiurus noveboracensis noveboracensis.** WATER-THRUSH.—A pair three miles above the Grand Falls of the Madeleine River, Aug. 13.

147. **Oporonis philadelphia.** MOURNING WARBLER.—Townsend has a record for one at Cross Point, July 5, 1919.

148. **Geothlypus trichas trichas.** MARYLAND YELLOW-THROAT.—Two pairs at Grande Vallée and a single bird at Little Fox River, the middle of August.

149. **Wilsonia pusilla pusilla.** WILSON'S WARBLER.—A pair with young found at Ste. Anne by Townsend early in July. Aug. 16 at Pointe Jaune I saw five birds in birches at the road side.

150. **Wilsonia canadensis.** CANADA WARBLER.—A flock of ten behind camp, Sept. 25. June 18, I found numbers between Mont Louis Lake and the village. A week later they were at North Branch.

151. **Setophaga ruticilla.** REDSTART.—Several seen along the coast; one at the forks, July 8.

152. **Anthus rubescens.** PIPIT.—Twenty late migrants were found on the lower shoulder of Dunraven, Sept. 28. A male was collected on the top of the mountain, June 28, and a colony consisting of about fifteen pairs nested in the vicinity of the Horned Larks.

152. **Nannus hiemalis hiemalis.** WINTER WREN.—One in full song Sept. 26, near largest of the North Branch Ponds. The next day a bird was found along the trail half way to the mountains. May 2, one was heard near the same place; at that time there was four feet of snow. After May 23 their songs were heard all along the trail. Its vivacious warble was matched for frequency only by the Ruby-crowned Kinglet's during the first two weeks of June. July 16, a nest found near the trail four miles south of camp; the young partly fledged.

153. **Certhia familiaris americana.** BROWN CREEPER.—Nov. 2 three were found along the trail to Tabletop grubbing over the trunks of spruce trees and exchanging low calls. First spring arrivals at the forks April 12, continuing there two weeks later. At North Branch, May 2.

154. **Sitta carolinensis carolinensis.** WHITE-BREASTED NUTHATCH.—July 9, an individual was seen a mile below the forks.

155. **Sitta canadensis.** RED-BREASTED NUTHATCH.—Several heard calling near the forks, April 22. June 24, a pair was seen on the trail to Mont Louis Lake.

156. **Penthestes atricapillus atricapillus.** CHICKADEE.—On Sept. 24, I met with a flock of thirty in birch woods on the lower Mont Louis River. They were uncommon upland, although often as far as Mont Louis Lake. Nov. 2, a pair was found in heavy spruce growth filling the valley between two mountains of the Tabletop section. Resident in small nunbers, increasing after March 15. A nest found June 6.

157. **Penthestes hudsonicus littoralis.** ACADIAN CHICKADEE.—Plentiful all through the interior. A nest found near camp was lined with bits of rabbit hair.

158. **Regulus satrapa satrapa.** GOLDEN-CROWNED KINGLET.—Several seen near camp in September and October, returning in May. These modest creatures prefer the dense foliage of large spruce or balsam, while the Ruby-crowned is very active and melodious in the underbrush, or perched on the top of some pointed spruce.

159. **Regulus calendula calendula.** RUBY-CROWNED KINGLET.—Common after May 15. A pair nesting behind our camp, June 12. Only Juncos and Chickadees are more widely distributed than this species inland.

160. **Hylocichla mustelina.** WOOD THRUSH.—This unexpected song was heard May 15 near the edge of the woods on the trail down from the forks. June 4 at North Branch two were heard exchanging calls along the trail. I was able to mark the different positions as they moved down the valley in the direction I was walking, covering a distance of two miles. This was a clear record of migration inland from the coast. June 16, several were heard near the Madeleine River, ten miles south of camp.

161. **Hylocichla fuscescens fuscescens.** VEERY.—One along the road near Newport, Aug. 30. Reported from Cross Point by Townsend.

162. **Hylocichla aliciæ aliciæ.** GRAY-CHEEKED THRUSH.—One seen at the forks, July 8, and another at Grande Vallée.

163. **Hylocichla ustulata swainsoni.** OLIVE-BACKED THRUSH.—Oct. 17, a bird in song three miles above Mont Louis Lake. The next day I came on a pair on the trail to Tabletop, and Oct. 19 near Madeleine River another bird. Several between the forks and Mont Louis Lake.

164. **Hylocichla guttata pallasi.** HERMIT THRUSH.—In the early evening of July 10, a bird flew to the window sill of the cabin at the forks, evidently attracted by the lamp light.

165. **Planesticus migratorius migratorius.** ROBIN.—Sept. 24, a pair at the forks and at North Branch camp as late as Oct. 29. Nov. 2, an individual was seen on the south slope of the snow-covered peak of McNab. Several songs near the village late in the afternoon of May 5. During the next ten days their numbers increased and they reached the forks, where snow was still on the ground. Nesting there June 18. The first to reach North Branch was on May 31. Lewis found a single bird on Bonaventure Island, Dec. 10.

The hundred and sixty-five species recorded here, supplemented by notes of other observers, are strictly of the Canadian type with certain of the Hudsonian and Transition forms. The possibility of this association, as has been suggested, is demonstrated by the sharp contrast to be found in the geography of the county. The southern portion of the Peninsula between Gaspè Bay and Mackerel Point, the boundary line of Bonaventure county, is

similar to the province of New Briunswck in climate, is largely deforested, and furnishes good farm land. This was one of the first sections of the Dominion to be colonized, its history going back to the days of Cartier.

On the north side, on the shore of the Gulf, the country has been changed only slightly by the handful of settlers; the primeaval state of things, I imagine, would go on indefinitely were it not for the paper industry. It was said that our cabin at the forks would next year be displaced by a power plant which would be linked with a pulp mill at the village. There is also agitation at present to build a railroad from Matane eastward over the plateau of the Shickshock Mountains, in order to give access to the rich mineral deposits known to be there. The first to be routed by these inovations will be the caribou and moose, because they have ranged their narrow mountains without restraint and have no experience with man's shrewdness. The birds have many strongholds.

559 West 183 St., New York, N. Y.

REARING YOUNG RED-BREASTED NUTHATCHES

BY FLORENCE K. DALEY

(*Plate XXIV*)

ONE early morning in June the Forrester of the Winnisook Club, Slide Mountain, in the Catskills, found on the ground five tiny Red-breasted Nuthatches (*Sitta canadensis*) not more than a few days old. He at once made a search for the nest, but looked in vain, no mother bird, no nest anywhere to be found, so he gently gathered up the five and carried them to a club member, who tried to care for them, her first thought was food—but the problem of predigested food faced her. Happily the softness of bread and milk suggested itself, but before she could prepare the food two of the little birds had passed away.

To the remaining three, she offered a bit of the milk-soaked bread using a small pair of tweezers and imagine her joy when three mouths opened wide and devoured all they could hold.

Knowing of my interest in birds and bird banding she sent word to me of the three orphans and I lost no time driving the four miles from Frost Valley where our cabin is located to Slide Mountain. When I arrived I found the Nuthatches swathed in cotton resting in a small berry basket, apparently well and happy as if tucked away in their nest far up in the wilderness. Having been actively interested in the study of birds of this region, I was at once presented with these Nuthatches. I drove them down from the mountain to our valley home and they traveled well and were ready for their meal of bread and milk.

The next thing in order was to prepare a comfortable and natural home for them. Knowing the habits of Nuthatches and their love of hunting and pecking in the crevices of the bark of trees, I decided to transfer them to a Warbler trap cage, one that I had placed in our orchard hoping to entice Warblers into the top door opening, so that I might band them. This cage was a happy thought for it was roomy enough to line it with hemlock bark and still give them space for exercise. I hesitated about perches, for these birds are creepers, but I added two perches and a swing to the furnishings.

YOUNG RED-BREASTED NUTHATCHES ON BARK IN CAGE.

UNIV. OF MICH.

Later I was to have much enjoyment watching their acrobatic stunts, flying to the swing, hanging head down and sometimes turning over and over while the swing was going full speed.

The next problem was to make a nest for them such as their parents had labored so hard to build deep in a tiny hole in some tree. Fortunately every autumn I collect nests, so after looking over my collection I selected from several of the nests the materials to build a nest best suited to Nuthatches, and lined it with the fresh feathers that the Wrens so kindly left for us. I now placed all three in the nest in the cage and in half a minute they snuggled down and were fast asleep. In half-an-hour however there was much twittering and "yonking," so I fed them and from that time on they were fed every half hour from 8 A.M., to 8 P.M., when they were covered with a light cloth and slept quietly every night, all snuggling down close together in the nest.

I noticed next day that they seemed to be in great discomfort, scratching and picking at their poor little feathers, so I decided to give them a dust bath of insect powder. I used "Black Flag"—after three dust baths and scattering the powder in the nest they were entirely free from lice and seemed to grow stronger from that time on. I had now had my adopted family about five days and they were developing fast, so I decided to vary the menu. In buying seeds for my traps I had bought many packages of canary seed and each package contains a small block of mixed food called "Sing Restorer" a tonic for young and adult birds—so I decided it might be good for my little family. I removed it from the tin and moistened it with warm water and added a few finely chopped walnuts. All three ate it greedily so I varied their meals from the fifth day, one half hour bread and milk, the next "Sing Restorer," and in between water from a medicine dropper which they particularly enjoyed. It was very amusing to watch their antics and the difference in their individualities.

It was now ten days since their arrival and they were almost full-sized, fully feathered Red-breasted Nuthatches. They would hammer away at the bark and hunt in the crevices for grubs in regular grown-up fashion, so I placed tiny pieces of suet there and they were not long finding the treasure.

On the eleventh day I heard a soft "yank yonk" outside the

porch in a near-by tree and there I saw an adult Red-breasted Nuthatch. I looked quickly at the cage thinking my eyes deceived me—but there were my three and outside was a fourth Nuthatch. I took the cage out under the tree and such a twittering, "yuck yuck" from above, and a chorus from the cage. It was feeding time so I proceeded to feed my family where the visitor could watch the proceedings. I had just started when I heard a flutter of wings, and down on my head the visitor flew—that was one of the most thrilling moments of my life.

I continued to feed the hungry babies and the visiting Nuthatch continued to watch me and even perched on my head. It then occured to me that she might like to visit in the cage—I opened the door, and in she flew without a moment's hesitation. The three seemed to expect her and snuggled so closely she was almost smothered by their cordial greeting, but she allowed them every liberty. I offered her the menu of the day, but she refused to eat. I then offered her water which she accepted and enjoyed from the medicine dropper; but as meal after meal passed and she refused to eat I decided to hunt some grubs and worms, but eat she would not. It was now bedtime and as soon as I put the cover on the cage all four snuggled down in the nest and were soon fast asleep. In the morning the visiting Nuthatch looked droopy, so I decided to release her. I placed her in a tree and after a minute or two she flew to another tree, hunted for her breakfast, then off toward the woods and that was the last time I saw her, but I banded her, and in the autumn I hope to see 6898 once again.

Three days later one of the three, strong and healthy in the evening was barely breathing in the morning and soon passed away—the others did not show any depression.

We were now nearing the time when I felt the remaining two must try their wings, so I allowed them the freedom of our screened porch. They flew about strongly from the first minute and took great delight in creeping all over the screen head down. This told me that our time of parting had come, so the next day I placed them in a tree in the orchard. They lost no time hunting food, flying from tree to tree "yank yonking" their gratitude, but they did not forget their foster-mother even after being admitted to the select company of the Chickadees. Whenever I opened a door to

go out into the orchard they would hear me and come flying to my head, shoulders or arms—"yank yonking," sometimes refusing to stir while I walked all about the cabin. I always carried a cup full of bread and milk and they never refused refreshments. This continued for several days, but each day I could see they were busier taking trips to the woods with the Chickadees until one morning I opened the door in vain for there was no cheery "yonk yonk." I have not seen them since—but hope some day when I open the door to find my full-grown Nuthatches 6896 and 6897 waiting to greet me.

Olivea, Ulster County, New York

GENERAL NOTES

Black Skimmer (Rynchops nigra) Nesting in Ocean County, N. J.—The Black Skimmer is coming back. For a good many years the farthest north breeding colony known has been Atlantic County, N. J. This colony was visited in July, 1926, by Alden H. Hadley of the National Association of Audubon Societies and the number of adults estimated as 250, which according to my July 1925 count indicates an increase. On June 28, 1926, while looking for breeding colonies of Gulls and Terns on the islands in the coastal bays of Ocean Co., N. J., I found on a small island occupied by several hundred nesting Common Terns (*Sterna hirundo*), a pair of Black Skimmers and a young bird still in the down, evidently the nucleus of a new colony. I visited the island again on July 25 with Mr. Lester Walsh, and was surprised to find twelve adults, at least one well grown young and two nests containing eggs. The new colony had evidently received further recruits from the other group—probably birds that had been unsuccessful with their first sets of eggs.

The island on which the new colony is established seems to be free from rats. It is small, contains both grass cover and high mounds of sand and is an ideal nesting site. Such islands could easily be created in the shallow costal bays with the help of a sand dredge and show the possibilities in the future of creating without excessive cost, suitable nesting sites for many of our ocean and bay birds when our outer beaches are entirely appropriated for summer homes.—Charles A. Urner, *Elizabeth, N. J.*

An Unusual Set of Eggs of the Black Skimmer (Rynchops nigra).—Those who have had the opportunity of a visit to colonies of the Black Skimmer (*Rynchops nigra*), will have perhaps, noticed that, at times, very palely marked eggs will be seen in nests of this species, although the other eggs of the set are normally marked.

It was my good fortune, to find on July 6, 1926, a set of these eggs which differs from any which I have seen. I was investigating a colony of Black Skimmers upon a sand bar about 14 miles to the southwest of Charleston, S. C. In an area of, perhaps, two acres, two hundred and thirty-one nests with eggs were counted, and, among these was the set in point.

When first noted, all of the eggs appeared to be pure white. There were three in the set, laid in the usual slight depression in the sand, without any lining whatever. The ground color of all the eggs is pure white. One egg is totally unmarked, not the slightest suggestion of a spot marring its rather glossy surface. Another is almost identical, having two minute blackish spots about the size of a pin's head, near the larger end. The last egg shows three or four splashes of pale brown. It would be interesting to know the order in which the eggs were laid. Probably the more spotted one was the first, and the unmarked one last.—Alexander Sprunt, Jr., *Charleston, South Carolina.*

Gull-billed Tern (Gelochelidon nilotica) Breeding on the Coast of Georgia.—Since 1922 I have made several visits each year to an island at the mouth of the Savannah river where many hundreds of Least Terns and Black Skimmers breed. Forty or fifty pair of Wilson's Plover and two pair of Oystercatcher also nest on the island. Each year I have hoped that, attracted by the swarms of Terns and Skimmers, other species of water birds, particularly the more southern breeding Terns such as Cabot's and the Royal would come in and establish themselves. Every year a few of the latter are seen feeding in the sound and on the mud flats near the island, or mingling in flight with the Least Terns above the latter's breeding grounds, but they disappear early in June. My first trip to the island this year (1926) was made on April 26, in company with Thomas D. Burleigh, but few of the birds which breed there were in evidence. I again journeyed to the island on May 23, this time accompanied by H. B. Skeele, president of the Savannah Audubon Society, J. A. P. Crisfield, Noble Jones and G. R. Rossignol. The eastern end of the island is a high, bare, shell-encrusted area, about five acres in extent, composed of sand, crushed shells and black soil thrown up by suction dredges. The action of the surplus water flowing off has created little gullies and numerous portions of the area slope considerably. The balance of the island is low and flat, clothed in myrtle, lavender and long grass. When I entered the high section where hundreds of Least Terns had their eggs I soon became aware that a few unfamiliar Terns were hovering overhead, but I paid little attention to them, hurrying on down to the north beach to examine a nest of the Oystercatcher which I had found during my previous visit. In going there I passed through a narrow strip of drift-strewn beach. I spent some time in the vicinity of the Oystercatcher's nest searching for Willets and Wilson's Plovers. Returning to the spot where I first encountered the windrows of marsh grass, I continued on down the beach examining the little elevations and searching the open, sandy, shell-encrusted area between the dead drift for nests of Wilson's Plover As I reached this point several birds which I thought were Cabot's Terns began to circle overhead, uttering a peculiar laughing cackle. They were too wary and flew too high for satisfactory identification, but their actions were those of breeding birds and I set about to find their nests. At each step the birds became more solicitous and I soon became positive that whatever they were their eggs would soon be found. Taking a zigzag course, I searched now up on the shelly slope then back to the drift sprinkled sand, and had gone perhaps five hundred feet when my eyes rested on a nest containing three eggs, and a moment later I spied a second and a third, each containing two eggs. At this moment Rossignol hove in sight over the crest of the hill and I called to him to come and assist in the identification of the eggs. We retreated down the beach two hundred feet or more, and in a crouching position watched through 8-power glasses for the birds to alight on their nests. This they soon did and we identified them as Gull-billed Terns. The nests were in windrows of dead marsh grass stems about fifty feet above high

water mark. The three were in a direct line parallel with the shore line, the middle one, containing two eggs, being twenty-five feet from the other one with two eggs, and seven feet from the nest containing three eggs. All are substantial and well made, and each is almost an exact duplicate of the other. Into a hollow measuring about five inches across and an inch and a half deep, the birds had arranged a single layer of broken shells about the size of a ten cent piece. Upon this, but placed in a rather haphazard manner, was a close-set cluster of dead marsh grass stems, with numerous fragments trailing over the edge of the nest and extending in a little stream eight or nine inches beyond the rim, just as if some one had dragged the material into the hollow with a rake, leaving pieces along the way. Heretofore my experience with breeding Terns has been confined to one species—the Least, whose nests are probably the simplest of all, so I was a little surprised to see such elaborately lined structures. On June 13, I again visited the island and found additional nests with eggs. Three sets were collected; two by the writer and one by G. R. Rossignol. One of my sets being now in the collection of my friend Arthur T. Wayne, of Mount Pleasant, S. C.—W. J. Ericksen, *Savannah, Ga.*

The Sooty Tern and Audubon's Shearwater in South Carolina. —My friend Mr. Ellison A. Williams of Charleston, S. C., brought to me on July 30, 1926, a fine specimen of the Sooty Tern (*Sterna fuscata*) that was found dead by a negro on the Mt. Pleasant shore, by the bridge which connects Sullivan's island with Mt. Pleasant. The bird was greatly emaciated but was in fine nuptial plumage and when found could not have been dead more than a few hours since the rigor mortis had barely departed.

The bird was evidently blown north by the hurricane which began in latitude 15 N. near Martinique and lasted more than a week in its course northwestward. The wind velocity at Charleston on July 28 (from 8 A.M. to 10 P.M.) ranged from 31 to 54 miles per hour accompanied by heavy rain from 4 P.M. until midnight. At Nassau, N. P., the maximum velocity was 130 miles between Monday night and Tuesday night, July 26–27. Thinking that other specimens might be found on the barrier islands opposite here I suggested to Mr. E. von S. Dingle that he make an investigation and he visited Long Island on August 2, where he found many Sooty Terns and some Audubon's Shearwaters (*Puffinus l'herminieri*) all of which had been partly eaten by sand crabs and had obviously been greatly emaciated.

Several additional Sooty Terns were seen later on my place at Mount Pleasant, which had evidently recovered from the effects of the storm and another was caught alive on Pawley's Island near Georgetown on July 30.

In my 'Birds of South Carolina' (1910) I placed this species in the hypothetical list as there was no evidence of the bird ever having been taken in the state. Therefore the actual capture of a specimen as here recorded constitutes an addition to the avifauna. Mr. Williams very

kindly presented the specimen to me.—ARTHUR T. WAYNE, *Mt. Pleasant, S. C.*

The Sooty Tern (Sterna fuscata) at Charleston, S. C.—On the morning of July 29, about 7:30 A.M. the writer saw three Sooty Terns at Charleston, S. C. The coast of South Carolina had been visited the previous night by a West Indian storm, which had travelled up from Florida, where it devastated many places early in the week.

The three birds were seen flying slowly over the city, very low down, barely above the chimneys. A stiff wind was blowing at the time, and the flight of the birds was slow and wavering, showing every marking almost as distinctly as if they had been in hand. The morning was clear with bright sunlight.

As far as I know this is the first authentic record for South Carolina. This species is mentioned in the Hypothetical List of Arthur T. Wayne's 'Birds of South Carolina,' on page 216.—ALEXANDER SPRUNT, JR., *Charleston, S. C.*

Sooty Tern in North Carolina.—An adult female Sooty Tern (*Sterna fuscata*) was picked up in an exhausted condition near the northern edge of Raleigh, on August 1, 1926. The Boy Scout, Fred Dixon, who discovered the specimen, gave it to the State Museum. It was very much emaciated but otherwise unhurt, and in good condition for preserving.

On August 3, 1926, another adult specimen of this species was discovered, in a similar condition, by Jos. W. Womble, about five miles south of Pittsboro, Chatham County, N. C., approximately thirty miles in an air line from where the first was secured. When this specimen reached my hands three days later, it was too far advanced in decomposition to be saved, or even for the sex to be determined.

No doubt the very severe West Indian hurricane of the previous week accounts for the presence of these two birds so far from their natural range.

Our only other North Carolina record, since Dr. Coues saw a flock near Fort Macon in March, 1869, is an adult specimen—found near Raleigh in June, 1909, which was picked up in an exhausted and emaciated condition as were the two above recorded. In that case, however, I failed to ascertain the weather conditions south of us for the immediately preceding days.—H. H. BRIMLEY, *Raleigh, N. C.*

Sooty Tern (Sterna fuscata) in West Virginia.—On July 31, an adult Sooty Tern was picked up in a weed patch in a garden two miles from Charleston and brought to me for identification. The bird was slightly injured on the wing from being stepped on by a man when catching it. One leg was strained from being tied by a string after the bird had been captured. The Tern was in a very weakened condition and was unable to stand upright on its feet.

After being cared for for several days it seemed to regain some strength, and after feeding it raw beef it was banded with band no. 273487 and

released at 11 A.M. August 12. When first released , it fell to the ground and flopped for many yards and apparently was unable to fly. But I pitched it into the air in an effort to find out just for what reason the bird was unable to fly. I was astonished to find the bird flew off smoothly and strong, as if it had never been injured. It headed in a due line for the Atlantic coast.

This appears to be the first record of the Sooty Tern in West Virginia.

Judging from my experience it would seem that the Sooty Tern cannot rise or take wing from the ground when it is covered with weeds, grass or other vegetation.—I. H. JOHNSTON, *Charleston, W. Va.*

Audubon's Shearwater at Cape May, N. J.—On the morning of August 2, 1926, while bathing in the surf on the Cape May beach I saw a bird which was quite unknown to me, alternately flying and resting on the waves just beyond the breakers. Upon swimming out I was able to approach near enough to convince myself that it was a Shearwater but I soon lost sight of it as the sea was choppy and the bird was constantly disappearing in the trough of the waves.

Soon after probably the same individual was picked up by the life guards who were in their boat off the upper bathing beach and through the kind offices of Dr. and Mrs. T. S. Palmer, who were present, the specimen was saved and presented to me, although it had died by the time I received it.

It proved to be a young female Audubon's Shearwater (*Puffinus lherminieri*) and was in an emaciated condition with no trace of food in the stomach. It was at once prepared as a skin and is now in the collection of the Academy of Natural Sciences of Philadelphia.

With the exception of Audubon's vague statement that he had seen them "off Sany Hook" this is the first record of the species for New Jersey. The bird was evidently blown northward by the hurricane which prevailed in the West Indies and on the Florida coast a few days previously.—WITMER STONE, *Academy of Natural Sciences, Philadelphia, Pa.*

Old-squaw (Harelda hyemalis) at St. Joseph, Michigan.—On May 5, 1926, while standing on the dock at St. Joseph, a female Old-squaw swam in to the pilings and began feeding on the minnows with which the water fairly teemed. Her course under water could be readily followed by the fish springing into the air. The bird was entirely unsuspicious, and though I watched it for fifteen minutes, its movements gave no indication of injury. The latest spring date given by Barrows in 'Birds of Michigan' in April 3.—A. W. SCHORGER, 2021 *Kendall Ave., Madison, Wis.*

The Brent Goose of Spitzbergen and Greenland.—In Dr. Glover M. Allen's appreciative notice of Schiölers 'Birds of Denmark' (*antea*, p. 226), it is stated that Mr. Schiöler and I differ in the recognition of races of the Brent Goose (*Branta bernicla*). Personally I have failed to find any such difference, and find myself in entire agreement with Mr.

Schiöler. All birds from Spitsbergen and Greenland belong to the light-bellied race (*B. bernicla hrota*), while Siberian breeding birds are dark-bellied (*B. bernicla bernicla*). From Kolguer, where they are said to intergrade, our material is still very scanty. Migrants to the Faeroes, Iceland, etc., are quite as likely to be from Spitsbergen as from Greenland.—F. C. R. JOURDAIN, *Waverly Lodge, Ditchingham, Norfolk, England.*

Egret (Casmerodius egretta) at Greenville, Mercer Co., Pa.—On the evening of August 19, 1926, a friend telephoned me that a large "white crane" had been spending several days along the Shenango River, near his home, and when I arrived at the spot, I had no difficulty in securing a satisfactory view of the bird, approaching within fifty yards unobserved and watched it feeding for a considerable time. It was closely attended in its movements by an adult Great Blue Heron, which seemed an ardent admirer, and thus the comparative size was apparent, the Egret being somewhat smaller. Noted well the yellow bill and black legs, but the breeding season plumes were absent. This is the first time in recent years, so far as I can learn, that an Egret has been seen in Mercer County, Pa. The location was about five miles south of Greenville, Pa.—JOHN J. DONALDSON, *Greenville, Pa.*

Unusual Actions of a Great Blue Heron.—Last spring, while engaged in general field work for the Milwaukee Public Museum, the writer made the following observation.

We were making a series of motion pictures of the nest life a pair of Loons (*Gavia immer*), which had established their home on an islet in Bass Lake, Michigan, just across the Wisconsin line. Every day while en route to our "set up," we passed, by boat, through several small lakes, all of which are surrounded by virgin timber and are very deep. Great Blue Herons were abundant and birds from a neighboring rookery kept up a continual procession to and from the fishing grounds. At almost every turn a surprised Heron would clumsily flop up and away.

Upon several occasions a Heron was observed to alight for a moment out in the center of Mamie Lake. With the use of binoculars we could observe no swimming movements, but evidently the bird was interested in something on the surface, and after a moment flew. We sped up our motor and hurried to the spot. By the aid of a line and weight we found the water to be nearly thirty feet deep. Whether the action, several times repeated, was performed by the same bird we could not tell, but Mr. Twombley, our guide, informed us that he has seen Herons alight in the deep waters of Mamie Lake frequently. Having neither seen nor read of a similar occurrence, it was to us a point worthy of note.—OWEN J. GROMME, *Milwaukee Public Museum, Milwaukee, Wisc.*

The Yellow-crowned Night Heron (Nyctanassa violacea) at Madisonville, Ky.—In a swamp west of Madisonville, Hopkins County Kentucky, I identified an adult male *Nyctanassa violacea*, on June 27,

1926. He was perched on a dead tree, was surprised, and took flight as I came within fifteen yards. A week later, July 4, I found him again in the swamp. I searched the woods near-by for a possible nest and a female of this species, but I found no signs of another individual or of a nest. Since this individual was not to be found when I visited the site again on July 11, I have recorded it as a migrant. These are the only records of the species which I have for Hopkins County.

This is the same swamp that was visited last year by the Wood Ibis and Egret and for the past two years a pair of Prothonotary Warblers has nested there.—James Suthard, *Madisonville, Ky.*

Yellow-crowned Night Heron in Virginia.—The head, wing, and leg of an immature Yellow-crowned Night Heron (*Nyctanassa violacea*) were sent in to the U. S. National Museum on July 11, 1923, by Mrs. Edward Gary Butler of Boyce, Clarke County, Virginia. The letter accompanying them states that the bird had been "shot here a few days ago." Records of this species in northern Virginia are scarce enough to warrant publication of this record.—B. H. Swales, *U. S. National Museum, Washington, D. C.*

Yellow-crowned Night Heron in New Jersey in June.—On June 13, 1926 while Mr. John A. Gillespie and the writer were inspecting a Black-crowned Night Heron colony, which had been located by Mr. T. G. McMullin on Seven Mile Beach, New Jersey, we found an adult Yellow-crowned Night Heron. The bird stayed about one particular locality, leading us to believe that a nesting place was nearby, but careful search failed to reveal any. Subsequently on June 27, the colony was again visited by the writer accompanied by Henry Carey and Benjamin Hiatt. We found the bird still present but again careful search failed to reveal the nest. On July 24 however Mr. Richard Erskine visited the neighborhood and found two Yellow-crowned Night Herons feeding in a pool on the salt meadows while on July 31 he and Dr. Witmer Stone saw two adults and a young bird which associated with one of them and which they thought might be of this species although it was impossible to get close enough to be sure.—Julian K. Potter, *Collingswood, N. J.*

A Crane at Martha's Vineyard, Mass.—For an hour on July 25, last my daughters and I from our cottage on Indian Hill, Martha's Vineyard island, watched what was with absolute certainty a Crane. It passed directly over our camp at a height of perhaps 150–200 yards so that we could see it very distinctly—a great bird with dirty white or very pale gray plumage and black or nearly black primaries, neck stretched nearly straight ahead and legs behind but both slightly declined from the horizontal, and from time to time uttering its sounding cry.

In great irregular circles, partly with heavy wing-beats and partly awkwardly soaring for short distances, it rose to a great height and gradually moved northwestward across Vineyard Sound and disappeared in the

direction of the Elizabeth Islands and Buzzard's Bay. When certainly at least two miles away but still at times visible in favorable lights as it wheeled in its circling flight we could still hear its peculiar resonant yet somewhat bleating call.

My daughter Caroline I found later had made quite independently the following record and as she saw it before I did I give it for comparison.

"Saw Whooping Crane. First seen quite low, flying in circles and emitting whoops. Flapped wings in a laborious manner and sailed. Legs and neck outstretched horizontally. White with black wing tips. Ends of wings very ragged-looking. Flew out toward Cuttyhunk, back about to Falmouth, up again to Tarpaulin Cove, then back and out of sight towards Cape Cod. Whoop could be heard long distance even after bird was out of sight."

My daughters both disagree with my statement of the color of the bird and are positive that it was pure white except for the black or blackish wing quills. They are probably correct for they saw the bird when it was approaching from the southeast with the sun shining directly on it and from partially behind the observers and also when it was lower down. I saw it just after it had begun to soar and had passed overhead and was against the bright western and northern sky with the sun chiefly in front of me. Doubtless this difference in illumination explains our somewhat different interpretation of the color.

Concerning weather conditions on the 25th, the day was bright and sunny, calm and moderately cool. It was a clearing up day, after a a period of several days of strong southwest winds directly off the ocean, with showers and heavy fogs and very hot weather on the mainland. The bird came from the direction of the sea and might easily have followed the course of the Gulf stream on the high winds.

Now curiously enough in the latter part of an afternoon during the first week of August, 1924, with weather conditions similar to those of July 25, 1926, I saw in almost exactly the same spot an exactly similar bird which behaved in the same manner. I was sitting on my front porch which overlooks the whole length of Vineyard Sound, reading, when my attention was attracted by an unfamiliar trumpet note coming out of the northern sky. After a search for some minutes I discovered its source in a pale colored bird tracing wide circles at a great height and at least a mile out over the Sound. With my glasses I could see that both legs and neck were extended. Naturally I thought of the Whooping Crane, but the presence of one of these birds here seemed so improbable and it was so far away that I could not be certain of its characteristics, that I put this possibility out of my mind and finally succeeded in almost convincing myself that I had seen a Great Blue Heron gone insane and for some reason behaving in a manner quite new to me. Because the observation was so unsubstantial I said nothing about it. But now it seems quite certain to me that the bird seen in 1924 was identical with the Crane seen on July 25, last. The 1924 bird finally drifted northward and westward and

disappeared in the direction of Buzzards Bay and the base of Cape Cod on a course that was separated by not more than half a mile from the course taken by the 1926 bird. In fact if one of his side meanderings the latter actually crossed the course of the former. Now as to the identity of the bird I saw. I hold no brief for any particular species of Crane but I never for a moment doubted that it was a Crane of some kind after getting a good view of it. Whether it was a Whooping Crane, a pale phase or even an albino of the Sandhill Crane or an exotic species that might have escaped from a zoölogical garden or a preserve I do not know.

If any ornithologists believe in the immortality of the avian soul they may conclude that the spirit of some old Whooper of Colonial days makes a yearly visit to his old haunts and that I have been lucky enough to see it on these two occasions.—J. PERCY MOORE, *University of Pennsylvania, Philadelphia,*

(Dr. Moore's most interesting observations led me to inquire as to the possibility of some exotic Crane being at large in this part of Massachusetts and Mr. W. Cameron Forbes of Boston replies to my letter as follows: "I have repeatedly seen the bird of which you speak, which is said to be a Japanese Crane, escaped from some zoological garden. It flies over the vicinity of Cape Cod and we have seen him almost every year. He has a certain cry which is very penetrating and which calls attention to his presence. I hear it from my house and look out to see him. I have seen him two or three times this year and I think almost every year for the last nearly ten years now." If anyone is in possession of additional information 'The Auk' will gladly publish it.—Ed.)

The Calls of the King and Virginia Rails—Descriptions of the calls and notes of Rails seem to be much confused. So much so in fact that they are of little value in identifying the birds. That this confusion sometimes is justified is proved by the following experience. On June 6, 1926, as I was walking over a bridge that crosses a cattail and grass marsh at the upper end of Newton Lake, Collingswood, New Jersey, I heard a Rail call and stopped in hopes that I might catch a glimpse of the author. Presently a King Rail came out of the cattails into the short grass and could be seen very plainly, calling at intervals. The note very much resembled the squawking noise made by a boy giving a sharp quick blow on a blade of grass placed between the thumbs. Soon another Rail, supposedly the same species, squawked in exactly the same manner from a bunch of cattails a short distance away. The first Rail slowly made his way through the grass toward the second bird. Meanwhile this bird had come into view and was plainly seen by the size and coloration of the head to be a Virginia Rail. The King Rail was now silently walking toward the Virginia while the latter continued to call. Suddenly the King made a swift dash at the Virginia. The latter instantly flew a few yards out in the grass and presently started calling again as it made its way back to the cattails now occupied by the King Rail. The latter at this time was skulking

along the edge of the cattails, almost motionless but as soon as the Virginia reached the edge, he dashed out and the Virginia retreated as before. This performance was repeated again and again. The Virginia was squawking most of the time and the King at intervals. Both were plainly seen and the notes of one could not be distinguished from those of the other. Timing of their calls proved that there is no regularity in the intervals. At one time two King Rails were in view, one walking out of the cattails into the grass while the other skulking along watched for the approach of the Virginia. Suspecting a nest of either or both species I searched the cattails on June 15 and soon flushed the Virginia from a nest containing eight eggs and found two false nests of the King, a habit which Mr. Richard F. Miller informs me, is common not only to this Rail but to others as well. Although subsequent visits were made to the marsh, the Kings never revealed themselves after the first visit. The Virginia when flushed from the nest, always squawked from the nearby cattails. Once a clattering call similar to that of the Clapper Rail was heard from the direction which the bird had taken. This may have been the Virginia or it may have been the King as neither bird was in sight at this time. On June 24 a heavy storm flooded the marsh and put an end to further observation.—JULIAN K. POTTER, *Collingswood, N. J.*

Hudsonian Curlew in West Virginia.—The recording for West Virginia of the Hudsonian Curlew (*Numenius hudsonicus*) was a reward of a recent camping trip into Cranberry Glades, Pocahontas County, W. Va. This interesting bird, far off its usual migration range, was seen on May 25, 1926. The specimen was taken and presented to the collection of West Virginia University, Morgantown.

The Glades region includes several hundred acres of marshy land, the bed of a geologic lake, in the Alleghany highlands of the state. A number of open glades are thickly covered with sphagnum, in turn supporting a heavy growth of cranberries. The flags and the alders around the borders make a wonderful region for Swamp Sparrows and Alder Flycatchers. The elevation is about 3100 feet.

When first seen the Curlew was moving about in the largest of the open glades, a tract of about 100 acres. Although moving freely, and able to fly at will, it showed none of the fear commonly ascribed to the species, and allowed itself to be closely approached. It seemed to be feeding, but whether on the last year's cranberries which adhered to the vines, or on insects which swarmed in the sphagnum, we were unable to determine. On our near approach it became stationary and very attentive to our movements, so that it was thought advisable to take the specimen for positive identification.

So far as has been determined there is no previous record for this species in the state.—C. L. BROOKS, *Morgantown, W. Va.*; A. B. BROOKS, *Buckhannon, W. Va.*; MAURICE BROOKS, *French Creek, W. Va.*

Another Preoccupied Name.—In 1922, Messrs. Osgood and Conover (Field Mus. Publ. Zoöl. ser., vol. 12, no. 3, 1922, p. 27, pl. 1, lower fig.) named *Odontophorus guianensis canescens* from the Rio Cogollo, District of Perija, Zuliá, Venezuela, based on a single specimen, the male, taken from what the authors believed to have been a mated pair. Unfortunately the subspecific name *canescens* proves to be a homonym of a name already in current use in the genus *Odontophorus*—*O. parambae canescens* Chapman (Am. Mus. Novit. no. 18, 1921, p. 4, Alamor, Province of Loja, Ecuador), and the bird described and figured by Osgood and Conover therefore requires a new name, which it is to be hoped these gentlemen will provide immediately.—James L. Peters, *Museum of Comparative Zoology, Cambridge, Mass.*

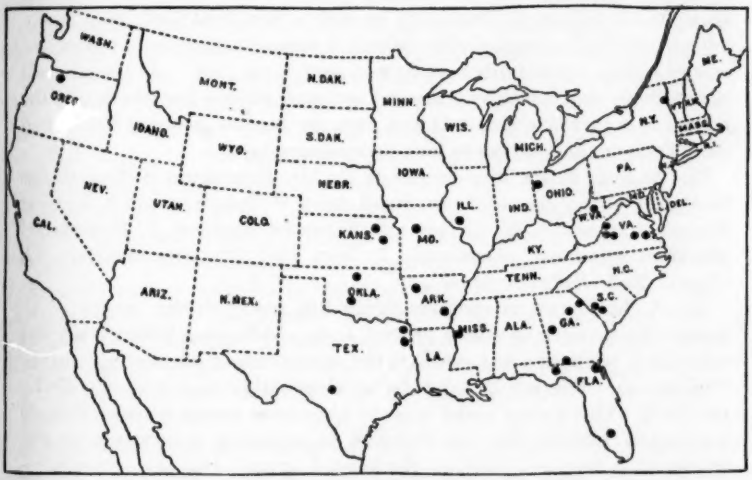
Turkey Vulture Nesting in Beaver County, Pennsylvania.—Although the Turkey Vulture (*Cathartes aura septentrionalis*) is considered a regular summer resident in this region, I am unaware of any published account of its actual nesting in western Pennsylvania. Therefore the following notes, which I am enabled to present by the courtesy of Mr. Joseph J. Johnen, of McDonald, Pa., seem worthy of record.

On June 6, 1926, Mr. Johnen discovered a Buzzard's nest in an old snag on his father's farm one and one-half miles southwest of Frankfort Springs in extreme southern Beaver County. At that time the nest contained an addled egg and a downy white young Buzzard about the size of a baseball, which Mr. Johnen judged to be about two days old, as it was too young to hold up its head. Five days later (June 11) I made a special trip from Pittsburgh to see the nest. It was merely the natural litter at the ground level inside the hollow shell of an old oak standing in a small patch of woods at the back of the farm. The snag was about four feet in diameter inside and 16 or 17 feet high, but was torn down each side by a wide cleft. The bottom of one was about 10 inches wide and only 53 inches above the ground, and it was through this that the adult Buzzard gained entrance to the interior. As we approached the snag through a tangle of vines, one of the parents birds sprang up from the nest into the cleft, and then flapped to a near-by tree where it sat for several seconds before making off. The other parent was not seen. The addled egg was still in the nest, and quite warm, indicating that it was yet being incubated, but search as we would, we could discover no trace of the young. It can only be assumed that some prowling mammal, entering through one of the small holes at the base of the snag, had found tender squab Buzzard no mean dish.

A lady eighty-five years old, who had been a resident of the district since 1856, stated that she had never before heard of a Buzzard nest in this region.—Ernest G. Holt, *Carnegie Museum, Pittsburgh, Pa.*

Hawk Abundance and Hawk Campaigns.—Ornithologists generally feel that Hawks have been so reduced in numbers that their depredations on poultry should be nearing the vanishing point. Apparently this stage has not yet been reached as correspondence about Hawks still bulks large

in the files of the Biological Survey. Typical statements are that the Hawks get ' half the hatch,' ' 400 out of 750 chicks,' ' 40 chicks in 3 days,' and the like. One correspondent in Oklahoma alleges that farmers lose from $25 to $100 apiece through the destruction of poultry by Hawks. While tabulating the specific complaints for the years 1918–1926, about Hawks destroying poultry the writer noted that a high proportion of the localities represented were in the southeastern quarter of the United States. As the expectancy, at least in the region of the old eastern forested area, would be for a random distribution, segregation of the records aroused interest as to possible causes. On the accompanying map (see fig.) are spotted the thirty definite complaints for the period cited. Various reasons conceivably are jointly responsible for the apparent greater destructiveness of Hawks in the southeast. Here poultry often is permitted to roost out-



of-doors, and protected runs are less frequent than on the chicken farms that are quite numerous in the northeastern states. However, it is almost certain that Hawks are more numerous in the southeast, partly because of concentration there in winter, but also apparently at other seasons. From the standpoint of the bird lover alone it is good news that there are some Hawks left somewhere. The age-long warfare against these birds is certainly showing results now that the human population has so largely increased. About Washington, D. C., there has been roughly a decrease of 90 per cent in each of the two twenty-year periods. In nearby Virginia where a state-wide campaign against Hawks has been carried on for some years, they are very scarce, but as usually observed under such circumstances it is the elusive Cooper's and Sharp-shinned Hawks that are holding out to the last. These species, against which such campaigns

are primarily directed, rarely are seen by the ordinary observer while the larger, more slowly moving, and more beneficial Buteos are comparatively easy victims. Thus the result of a Hawk campaign is the maximum destruction of the more beneficial species, and minimum destruction of, and subsequent freedom of the field, for the more injurious types. It may be added that although the Virginia campaign was carried on primarily for the benefit of game, Quail are not perceptibly more numerous than formerly in areas near Washington, D. C. where Hawks have been nearly exterminated.—W. L. McAtee, *U. S. Biological Survey, Washington, D. C.*

Findings in Pellets of Barn Owl.—In the attic of an old rice mill near Charleston, S. C., on March 25, 1926, with Mr. E. B. Chamberlain and Mr. Alexander Sprunt, Jr., I found numerous pellets of the Barn Owl (*Tyto pratincola*) together with the evidence of the nesting of the bird. As the Barn Owl is universally known to be such a beneficial bird, very rarely killing anything but undesirable rodents, it seems worthwhile to record this rare exception where birds have formed part of the prey. As the rice mill has not been used for many years and as the plantation has reverted to the jungle, it is probable that rats and mice are far less common than when these Owls or their ancestors took up residence here.

The findings in the fifty-six pellets by Mr. Remington Kellogg of the Biological Survey are as follows: Small shrew (*Cryptotis parva*), 2, Rice rat (*Oryzomys palustris*), 65, Cotton rat (*Sigmodon hispidus*), 1, Red-winged Blackbird (*Agelaius phoeniceus*), 7, Sora Rail (*Porzana carolina*), 12, Clapper Rail (*Rallus crepitans*), 4.

Dr. A. K. Fisher, in communicating this report to me, writes: "Although the matter can not be proved, I am wondering whether Rails and other birds which in a way simulate the movements of rats and mice in the thick foliage might not be taken by accident rather than intentionally by the Owls. This theory would seem to have some weight because they do not molest pigeons that are breeding in adjoining apartments or any species that are not found on the ground around marshes or fields."—Charles W. Townsend, *Ipswich, Mass.*

Richardson's Owl (Cryptoglaux funerea richardsoni) in Cook County, Minnesota.—Late spring and summer records for Minnesota are not common. On the cloudy afternoon of May 20, 1926, I was fishing for trout along the southern shore of Rose Lake, which is intersected by the international boundary. Down from the high, forested shore came the bell-like *ting, ting, ting* of Richardson's Owl, notes which have been so charmingly described by Seton in 'The Arctic Prairies.' The guide, scenting the cause of my distraction, volunteered the information that the sound came from "a small owl" and that "it also sings at night."—A. W. Schorger, 2021 *Kendall Ave., Madison, Wis.*

Red-headed Woodpecker Nesting in Maine.—On July 4, 1926, at Cumberland Center, a village just outside of Portland, Me., I had the

peculiar pleasure of studying the nest of the Red-headed Woodpecker (*Melanerpes erythrocephalus*), a bird with which I am familiar in the southern states but had never before found in Maine.

The nest was discovered by the Misses Margaret and Mildred Wyman of Cumberland Center. It is located in the town on the Drown Farm, Tuttle Road, in an American elm beside the roadway. At the very first fork one main limb is partly dead, evidently broken off by lightning or wind. The hole is 20 feet from the ground. One week previous to this date it was noted that both male and female became very active, indicating a hatch. There was quite a company of us viewing the nest and watching the pair this morning. Rev. Burton A. Lucas, Walter Blanchard, Donald B. Ames, Arthur H. Norton, Herbert M. W. Haven.

Both male and female brought food, and one was seen evidently bearing droppings from the interior. Not a sound could be heard from the young, and this together with the fact that the parent would be inside the nest hole for a long time made us believe that the young were but a few days old.

Not once did I hear the parents utter a note in all their goings and comings. This was in decided contrast to their noisy behavior in the South.

Mr. Norton sends me the following summary of the occurrence of the species in Maine. "The Red-headed Woodpecker is of frequent, though not common occurrence in southwestern Maine, with less frequency east to the Penobscot, and up the Kennebec Valley to the vicinity of Farmington. It is of casual occurrence through the northern and eastern sections. Records at hand show it to have been observed from April 3 to June 9 in spring, with more occurrences in May than any other month. It has also been observed in July and August (one record each) and in fall from September 2 to October 16. In 1881 one was observed in Portland from November to December 25. (Brown, Proc. Portland Soc. N. H., 11, 20.)

According to Everett Smith, it was "not uncommon in Cumberland County in the Fall of 1877." (1882, Smith, Forest and Stream, XVIII, 208.) Concerning its breeding in the State we have no satisfactory evidence. S. J. Adams reported it as "breeding sparingly" in York County: (1897, Bull. 3, U. of Me., 74). In 1908, Miss Sara C. Eastman reported seeing two adults and two young, September 2–6, 1908. Unfortunately we are not certain about locality, but either the vicinity of Paris, (probably) or Portland. But this of course, is not a veritable breeding record, since the young, well described, (1908, Jour. Me. Orn. Soc. X, 114) were flying and may have come from a long distance away, and may have been many weeks or several months out of the nest.

The observation of these birds nesting here made a notable celebration of the day for me. A red, white and blue bird on the "Fourth of July!" —Harold W. Copeland, 112 *Park Ave., Bridgewater, Massachusetts.*

Arctic Three-toed Woodpecker in Winchendon, Mass.—On June 11 it was my good fortune to find a female Arctic Three-toed Woodpecker in a hemlock tree bordering the golf links. I hoped that I might find the

bird breeding here, but it was never again positively identified. June 11 is an extremely late date for *Picoides arcticus* in this region, but I have since learned that one was recorded this year at Concord, Mass. (about fifty miles southeast of here) on June 17.—FREDERICK M. CAPEN, *Winchendon, Mass.*

The Nest of Automolus ochrolaemus pallidigularis Lawrence.—While studying at the Barro Colorado Biological Station in the Panama Canal Zone I recently had the opportunity of observing the nest of this Furnarid. On March 23, 1926 my companion, Mr. F. M. Gaige, found the nest in a hole near the top of a perpendicular cut bank in hard clay, four feet above a small stream running through heavy jungle. He discovered it by watching the parent bird bringing small lizards to the young. The next day I accompanied him to the nest and collected the female as she came to the hole carrying in her bill a small lizard (of the species known at present as *Anolis limifrons*). The nest, which contained two half grown young, was situated at the end of a horizontal tunnel over sixty cm. deep and was composed almost entirely of a single kind of slender leaf stalk about ten cm. in length. The nest was quite bulky with a shallow cavity some ten cm. across and a thickened rim or approach on the side toward the entrance hole. The birds and nest are now in the Museum of Zoology, University of Michigan.

Dr. Witmer Stone (Proc. Acad. Nat. Sci. Phil., 70, p. 262, 1918) has recorded a nest of this species collected by L. L. Jewel at Gatun in 1911. This nest is described as "situated in a tree fork, seven feet up." In answer to a query of mine Dr. Stone writes "no doubt there was some error" for Jewel "referred to the specimens by number in his notebook and such a method always opens up a way to error."—JOSSELYN VAN TYNE, *Ann Arbor, Michigan.*

Death of Young Phoebes due to Over-feeding?—I am indebted to S. Harkness McCrea, of Darien, Connecticut, for the data here presented, which seem sufficiently unusual to warrant permanent record.

According to Mr. McCrea, a pair of Phoebes (*Sayornis phoebe*) built their nest in April, 1925, on a shelf in the recessed entrance to his studio at Darien. The nest was located but five feet from an electric light that apparently was frequently burned to a late hour. Two sets of eggs were laid. A Cowbird's egg was deposited with the first and was removed, but only one of the Phoebe eggs hatched. The electric light naturally attracted many night-flying moths, which the adult Phoebe would catch throughout the evening to feed her single offspring. This bird soon died and the second set of eggs was laid. All five of these were successfully hatched and the same procedure was again followed. The young were kept literally stuffed with moths, the parents frequently continuing feeding as late as midnight. All of these young died when they were about half fledged.

It is possible that the diet of moths alone may have been wholly or mainly responsible, but it seems more probable that the continuous feeding had the effect of upsetting the normal daily digestion, with fatal results. As the adult birds probably continued their own feeding while engaged in caring for the wants of the young, it must be assumed either that the quantity of food consumed by them was governed wholly by appetite or that the mature functions were more readily adjusted to the increased hours of activity.—FREDERICK C. LINCOLN, *Biological Survey, Washington, D. C.*

Nesting of the Starling, (Sturnus vulgaris) in Michigan.—A nest of the Starling with five, nearly grown young, able to fly from the nest was found by me and members of my zoölogy class on June 5, 1926. It was in a partly dead hickory tree isolated from other trees in a farm lane some four miles northeast of Ypsilanti, Michigan. The nest was in a cavity evidently made by a Woodpecker and about twenty feet up. It was a bulky mass principally of straw, strips of bark and feathers and cemented internally, probably by the excrement of the birds, to form the bowl. A thick, dust with many insect fragments from dried droppings formed a deposit in the nest. Parts of June beetles (*Phyllophaga*) were recognized and an entire living white grub, that probably escaped the young, was found in the material. Streaks of excrement extended from the nest entrance down the tree trunk and the whole situation was foul.

The nest was first located May 7, 1926 by our seeing the bird leave the hole, but it was not examined until June 5. Seven feet below the Starling's nest was a hole occupied by a pair of Northern Flickers (*Colaptes auratus luteus*) with their young.

One of the young Starlings was brought to my house and placed temporarily in a box. This was in the evening. The next morning an adult was trying to feed the bird. No Starlings had heretofore been noted by me within a mile of my home, and the nest from which the bird was taken was about five miles away.—T. L. HANKINSON, *Ypsilanti, Michigan.*

Idiopsar brachyurus in Argentina.—In a small collection of birds lately received from a collector in Argentina there is a specimen of *Idiopsar brachyurus*. This bird, a male, was secured in July, 1924, at Laguna Eslocada, in the Sierra de Zenta at 4500 meters, Departmento de Humahuaca, Jujuy, Argentina. This appears to be the first record for the species in Argentina; the specimen is now number 264,526 U.S.N.M. The label gives the iris as coffee colored, bill dull brown, and tarsus clear brown. The measurements are as follows: Wing 97 mm.; tail 67 mm.; culmen from base 20 mm.; and tarsus 26.5 mm.

Idiopsar has an interesting history. It was long known only by the type in the United States National Museum, secured at "La Paz," Bolivia, and described by Cassin (Proc. Acad. Nat. Sci. Phila., 1866, 414). It now appears that the type has a deformed bill, since it is worn and elongated, measuring 25 mm. This type, No. 32,664, U.S.N.M., was one

of several birds received from Mr. David K. Cartter bearing the general locality "La Paz, Bolivia," and may perhaps have come from some other section of that country. Dr. P. L. Sclater has some remarks upon this specimen, and furnishes a colored plate by Keulemans, in which the abnormalities noted in the bill have been to some extent corrected by the artist. (Ibis, 1884, 240.)

The species next appears in February, 1895, in Bolivia, at Iquico, on the Illimani at 4000 meters, and again at Rinconada on the road over the Andes; also east of La Paz at about the same altitude, in September, 1896. At these localities Herr Gustav Garlepp secured twelve specimens, including adults of both sexes and a young bird. All of these were nearly alike in coloration. The collector found it up to 14,000 ft. near the line of eternal snow. (Von Berlepsch, Ibis, 1898, pp. 62–65.)

In 1906, Mr. Herbert C. Robinson records a specimen in the Free Public Museum of Liverpool, secured prior to 1846 by Thomas Bridges near La Paz, Bolivia. (Ibis, 1906, 386.)

It appears that this striking and peculiar form ranges in the higher mountains from northern Argentina north into Bolivia.—B. H. Swales, *U. S. National Museum, Washington, D. C.*

Brewer's Blackbird Nesting at Madison, Wisc.—On the morning of June 9, 1926, while walking through a dry marsh just south of this city in search of Henslow's Sparrows, I noticed that a pair of Blackbirds were following me about excitedly and with continuous outcries. At first I paid little attention to them, supposing them to be some of our common Red-wings protesting my presence near their nest. After a time, however, I happened to glance at one which had a lighted on a low bush nearby and immediately forgot the Henslow's, for it was evident that the glossy bird before me was a Brewer's Blackbird (*Euphagus cyanocephalus*).

I watched the pair for the next half hour, during which time I saw each of them fly off and return with food in its bill, indicating that there were young ones about. Later in the day I returned with Warner Taylor and after a careful search we located the nest with three little ones which we estimated to be about ten days old. The nest was on the ground, well concealed by the short weeds and grass. It seemed to be particularly well located. The soil consists of a firm but spongy peat for a depth of two or more feet, with a blue clay sub-soil, giving such perfect drainage that after a hard, all-night rain I have found both ground and nest perfectly dry in the morning. The vegetation is abundant and very diverse, 18 kinds of herbs being counted in a small area. The ordinary marsh grass, however, grows so sparingly that the field was fit neither for haying nor for pasturage, and as the nearest road is 200 yards away the birds would have been entirely undisturbed had it not been for meddlesome ornithologists. The nest itself was composed of dried weed stems and fine strips of dried bark from some of the marsh shrubs. It was firmly attached to the roots and fibres of the soil so as to be practically a part of it.

The following morning A. W. Schorger, John Gundlach and myself went out and banded the young ones. Later in the day I found them all out of the nest, bunched together a few feet away. The next morning two of them were back in the nest, the other I did not see. On this occasion I collected the male bird. The next day they were again out of the nest, this time for good. The two we saw this time were strong and active and were able to make good headway through the grass by the use of their wings.

This is one of the few definite records for the Brewer's Blackbird in this state and is, I believe, the second nesting record, the first being June 14, 1862, at Lake Koshkonong, as given in Kumlien and Hollister 'Birds of Wisconsin,' 1903.—JOHN S. MAIN, *Madison, Wisconsin.*

Nesting of Evening Grosbeak at Woodstock Vermont.—During the winter of 1925–26 a flock of about forty Evening Grosbeaks (*Hesperiphona vespertina vespertina*) remained in the village of Woodstock, Vermont, paying daily visits to the various feeding stations. By May 10 the main flock had disappeared. On May 25, I saw a male and female both picking up small sticks but not believing they were really nest building I thought no more of it until July 12 when my neighbor, Mr. E. K. Wright, told me that a pair of Evening Grosbeaks had brought two young to his feeding box. On July 13, Mr. Wright said that four young and two adults were at his station at the same time. On July 14, I succeeded in seeing the four young with their parents at his station. The little ones were not quite as large as the adults, their tails were very short and many downy feathers still showed on their heads.

In connection with this nesting it is interesting to recall that on May 30, 1925, I observed a female Evening Grosbeak. Possibly they nested that year also.—RICHARD M. MARBLE, *Woodstock, Vermont.*

Further Notes on the Breeding of MacGillivray's Seaside Sparrow in South Carolina.—In 'The Auk' for July, 1924, p. 482, I published an account of the breeding of this bird in South Carolina. Since then several facts of interest have come to light which seem to be worthy of record and are here presented.

All investigations show that the nests are to be found in only one general locality, a large open tract of mixed salt and brackish marsh land near the station of Rantowles, S. C., about three and a half miles long by a mile wide and fourteen miles in an air line from the ocean. Repeated trips however have failed to discover a single individual in this locality in the winter. At this season they resort to the vast salt marshes about the barrier islands and in close proximity to the ocean, which are the haunts in winter of countless numbers of the three forms of Sharp-tailed Sparrows and the typical Seaside Sparrow. The MacGillivray's Sparrow leaves the breeding grounds for the coastal marshes late in the summer and returns about the middle of March. None have been seen in the coast marshes in the summer.

In 1925, I found a single singing bird on the breeding grounds March 19 and several on March 26, while by April 4 they were common and their songs were to be heard on all sides while the birds themselves were much in evidence. On April 29 when I next visited the marsh, three nests were found two with three eggs and one with four, while on May 25 only empty nests were found, the young doubtless being hidden in the grass. On my next trip on July 1, a nest with three eggs was found which was empty on July 13, although there were numbers of the birds present some no doubt birds of the year. Curiously enough when my wife and I visited the locality eight days later, on July 21, not a bird could be found. Evidently they had moved out to the coastal marshes. The finding of eggs on July 1 seems to point to the raising of two broods in a season. In 1926, my experience was much the same as in the previous year. The first bird was observed on the nesting marsh on March 25, on April 10 there were several and by the 24th, they were common. A nest with eggs was found on May 1.—ALEXANDER SPRUNT, JR., *Charleston Museum, Charleston, S. C.*

Dickcissel in Western Colorado.—On July 10, 1926, I found here for the first time a Dickcissel (*Spiza americana*). I saw it again in the same place a few days later and believe that it was nesting in or around a bunch of willows but was unable to find the nest. I believe this to be the first record of this bird on the western slope of Colorado.—A. R. MCCRIMMON, *Montrose, Colo.*

Nesting Data of Purple Martin at Vicksburg, Mich.—Two pairs of Purple Martins (*Progne subis subis*) arrived at a Martin box placed on top of a store at Vicksburg, Mich., on May 1, 1926. One pair made only a slight attempt at nest building but remained at the box with the other pair which built a nest and raised a brood of five young.

The first egg was laid on June 5 and four others on successive days always in the morning. Two eggs hatched on June 23, one on June 24, and two on June 25 so that presuming that they hatched in the order in which they were deposited they required respectively, eighteen, seventeen, seventeen, seventeen and sixteen days. The shorter time required for the hatching of the last egg may have been due to the fact that the presence of the sitting bird during the deposition of the eggs had warmed the nest and that development in the last egg began more promptly since regular incubation started as soon as it was laid.

The young were banded on July 11 and all left the nest on July 23, twenty-nine days after the last egg was hatched.

In my note in the July 'Auk' there is an error in the date of arrival for 1906, "March 6" should read "May 6."—F. W. RAPP, *Vicksburg, Mich.*

On a Guatemalan Specimen of Progne sinaloæ Nelson.—Through the courtesy of Mr. P. W. Shufeldt, of Belize, British Honduras, I have recently had the opportunity to examine in his collection the skin of a Sinaloa Martin that is of considerable interest.

In the first place, the specimen, an adult male in good plumage, taken by Mr. Shufeldt on March 14 1920, at Laguna Perdida, Department of Peten, Guatemala, represents an extension of range of well over a thousand miles, for the species has heretofore been known only from the type locality in northwestern Mexico.

Secondly, the skin under discussion seems to be intermediate between *Progne sinaloæ* and *P. dominicensis*. It has the pure white under tail coverts mentioned in the original description (Nelson, Proc. Biol. Soc. Wash., XII, 1898, 59) as diagnostic of *sinaloæ*, but lacks the glossy black dorsal feather tips which are also supposed to characterize that species. The concealed white spot at each side of the back is well marked. Mr. Ridgway (Birds N. and Mid. America, III, 1904, 38–40) considers *dominicensis* and *sinaloæ* exactly alike except in size, but in this respect also Mr. Shufeldt's specimen seems to fall into an intermediate position. This is illustrated by the following comparison with measurements from Mr. Ridgways' work.

	P. dominicensis 22 specimens	Shufeldt Specimen	*P. sinaloæ* 4 specimens
Wing	134–149 (143.5)	141	136–138 (136.7)
Tail	70–79 (74.2)	73.5	67–72 (69.5)
Fork of Tail	15–22 (19)	17	16.5–19.5 (17.5)
Culmen	10–12 (11.2)	9	10–10.5 (10.1)
Width of Bill	8.5–10 (9.4)	8.5	8–9 (8.4)
Tarsus	13.5–15 (14.1)	13	12.5–13.5 (13.2)

It is the fact that four of these six measurements point to an affinity with *sinaloæ* while only two suggest *dominicensis* that leads me to assign the specimen to the former.

It is significant that the specimen is intermediate between *sinaloæ* and *dominicensis* in its geographic as well as in its systematic position. Laguna Perdida is roughly 800 miles from the western coast of Jamaica, which is the western limit, so far as known, of the range of *dominicensis*. Of course it is unsafe to generalize from one specimen, especially as that may have been a migrant, but there is a strong suggestion that more material from Peten and the Yucatan Peninsula would demonstrate that *Progne dominicensis* and *P. sinaloæ* are conspecific.—Ernest G. Holt, *Carnegie Museum, Pittsburgh, Pa.*

The Prothonotary Warbler Nesting in Indiana.—On July 14, 1926, S. E. Perkins III, President of the Indiana Audubon Society, brought to my home a live male Prothonotary Warbler taken that morning at the Boy Scouts' Camp some eight miles away. He had driven his car with one hand and carefully held the bird in the other.

The particulars as given by Mr. Perkins are these. The bird was identified from their bird book by four of the Boy Scouts at their camp, ten miles northeast of Indianapolis. They found its nest containing four young in an old building used for a work room by the crafts classes where from

twenty to thirty boys were employed daily. It was placed about four feet above the floor on a two by four inch stringer and was composed largely of moss. The scantling showed through the middle of the nest so it could not be preserved. The parents entered the building which is about forty feet from the water (Fall Creek) by an open window some fifteen feet from the nest. The male bird was caught in an improvised trap made of an old screen set about fifteen feet from the building. One of the fledglings was placed in the trap. With about twenty boys about, it seemed doubtful whether the old bird could be captured, but after twenty-five minutes it entered the trap and one of the scouts pulled the string. Both the old bird and the fledgling were banded. The former being No. A79670; the latter No. A79669. The female and the other fledglings were not caught. It was noted that the tip of the upper mandible of the male parent was broken off. After the identification was verified the adult was returned to the place where it was captured and both were liberated.

It is my feeling that Mr. Perkins is entitled to credit for four unusual records: (1) This is the first verified record of the occurrence of the Prothonotary Warbler in Marion County, Indiana; and (2) the first verified record of its nesting in the county. (3) Is it not also the first record of its using such a nesting site? and (4) the first recorded banding of this species?

Hillis Howie reported this species from the same locality in late May, 1921, but the record was not verified.

Since writing the above Mr. Perkins has sent me the following extract from a letter of Miss Luci Pitzschler in reference to her observation of the nesting of the Prothonotary Warbler at McCormick's Creek State Park, Owen Co., Indiana, in July 1926.

"The nest of the Prothonotary Warbler is about a yard from the ground. The old stump, almost crumbling away, had no bark or hardly any, so I could not tell what kind of tree it was. There was a Sycamore right next to it and it was situated right at the border of the creek near the dripping spring. In the darkness of the hole and hidden way inside I saw two little yellow bills and the birds seemed to have dark fluffy feathers I first noticed the nest on the fourth (4th) day of July and about three days later it was vacated. I have heard that same loud quick whistle several times on the trail going towards the river and I saw the bird about three or four times."—Amos W. Butler, *Indianapolis, Ind.*

Black-throated Green Warbler in the Dismal Swamp.—Mr. Herbert G. Deignan and the writer spent the morning of June 20, 1926 in that portion of the Dismal Swamp that lies in North Carolina, just south of the Virginia line along what is known as the "new road," running east from Sunbury where the swamp is about four miles across.

We were standing on the edge of the road watching our first Prothonotary Warbler when we heard a familiar Warbler song and presently realized that it was the song of the Black-throated Green Warbler. After some search we found him singing from the very top of the trees and saw him distinctly,

especially once when he flew much lower than usual. We spent much time watching this bird and soon found that there were others of the same species present. We definitely heard one other male singing but could not locate him and saw several females or young birds. They remained in one party moving through the branches much as in migration and finally crossing the road disappeared in the swamp. We were very much surprised to find this Warbler so far south of its summer home at a time when it would seem that it must be breeding.—RUSSELL RICHARDSON, JR., 329 *South 16th St., Philadelphia.*

The Mockingbird at Suffern, New York.—On July 5, 1926, I saw an adult Mockingbird (*Mimus p. polyglottos*) in the Ramapo Mountains near Suffern, New York. Although only a rather short observation was possible I am confident of the identification as I am very familiar with the species in the south. The presence of a Mockingbird in the northern Transition zone of the Ramapo Mountains so late in summer is hard to explain. Mr. W. DeW. Miller, who has worked in similar country on the New Jersey side of the border, tells me that he considers its occurrence worthy of record.—HERBERT FRIEDMANN, 32 *Garden Pl., Brooklyn, N. Y.*

Summer Notes from the Kittatinny Mountains, N. J.—From the evening of June 18, till the morning of the 22nd, 1926, we occupied Camp Pahaquarra, belonging to the Trenton-Mercer Area Council, Boy Scouts of America. This is on the Delaware River, seven miles northeast of the Water Gap, and is in Pahaquarry Township, Warren County. We spent three full days afield, exploring a tract of land three miles long by a mile wide, the width running from the River (altitude, 301 feet) to the crest of the parallel ridge (maximum about 1600 feet). This is practically all Camp land except for two narrow farms along the river just below the Camp buildings, an old mining property. This entire slope and crest of the Kittatinny range is heavily timbered, except at some of the higher levels where the forest has been thinned by more or less recent fires. We found 69 species of birds, missing several which doubtless occur, and including several which seem worthy of record.

On two days we saw an adult Bald Eagle (*Haliæetus leucocephalus leucocephalus*) and once an immature bird along the River. A pair is said to nest on the cliffs of the Water Gap. Twice we saw a Logcock (*Phlæotomus pileatus abieticola*), and found workings of the species everywhere. Its local name is "English Woodpecker," the idea being that as it was unknown thereabouts 20 years ago and has since become common, it must be in the same category as the English Sparrow, Starling, and Pheasant. It is there at about its southern limit in New Jersey, unless it reappears in the Pine Barrens.

We listed 16 species of Wood Warblers, all doubtless breeding. These included four Carolinian species; the Worm-eating (*Helmitheros vermivorus*) and Hooded (*Wilsonia citrina*) were each fairly common on thickly-

wooded slopes, a pair of Louisiana Water Thrushes (*Seiurus motacilla*) had young out of the nest in the Ravine of the Mine, and a Yellow-breasted Chat (*Icteria virens virens*) sang daily beside the Camp buildings, near the River. But the Golden-winged Warbler (*Vermivora chrysoptera*) of the Transition Zone completely replaced the Carolinian Blue-wing (*V. pinus*); we found four pairs in open, upland woods, and a singing male along the River Road. This species had not been known to breed anywhere along the Delaware River in New Jersey. Another Transition species, the Chestnut-sided (*Dendroica pennsylvanica*) also frequented open woods and was about twice as common. A singing male Pine Warbler (*D. vigorsi*) was found in very open woods with scattered Pitch Pines well up on the mountain toward Catfish Pond, the third and southernmost isolated record for this species in the Kittatinnies, the others being at Round Pond (eight or nine miles northeast of ours) and at High Point, Sussex County, the latter station since destroyed. We found only two singing male Black-throated Greens (*D. virens*), both in old timber on the mountain side, one in a ravine full of hemlocks but no undergrowth. Associated directly with the Worm-eating and Hooded Warblers in the Ravine of the Mine were three pairs of Canada Warblers (*Wilsonia canadensis*), not in a swamp at high altitude such as the Canada usually frequents in northern New Jersey, but in this ravine with a mountain brook at the bottom and hemlocks rising from a dense growth of rhododendrons, and running from 340 feet to not over 1000. In this same ravine were two pairs of Blackburnians (*D. fusca*), and we found another male in an open growth of scattered pitch pines well up on the mountain toward Catfish Pond. A singing male and a female Black-throated Blue (*D. cærulescens cærulescens*), apparently of different pairs, were along a stretch of wood road through deciduous forest at the same altitude as the Ravine of the Mine. This and the Blackburnian had previously been found breeding only in Sussex and Passaic Counties, both farther north and at a higher altitude. The Canada also was not known to nest in Warren County.—W. DEW. MILLER, *American Museum of Natural History, New York City*, and C. H. ROGERS, *Princeton Museum of Zoology, Princeton, N. J.*

Notes from Northern Ohio.—The following records of wintering and breeding birds near Wooster, Ohio, are notable and the Field Sparrow (*Spizella p. pusilla*) is a very uncommon if not rare bird in northern Ohio during winter.

Archibuteo lagopus sancti-johannis. ROUGH-LEGGED HAWK.—Although common in central Ohio this bird is an uncommon winter visitor here. On February 6, 1926, one was seen near Wooster.

Asio wilsonianus. LONG-EARED OWL.—One found within the city limits on January 8, 1926.

Asio flammeus. SHORT-EARED OWL.—On January 20, 1926, three individuals of this species were found in a marsh near the city.

Ceryle alcyon alcyon. BELTED KINGFISHER.—A pair was seen near an open creek on January 17, 1926, at Wooster.

Sturnella magna. MEADOWLARK.—On January 17, 1926, five were flushed from a field here.

Spizella p. pusilla. FIELD SPARROW.—While walking over a snow-covered field on January 8, 1926, I encountered a bird of this species in winter plumage. It was tame and permitted close observation. The line through the crown, pink bill and feet, unspotted breast, small size and other characteristics of this species were noted, I was unable to collect it.

Protonotaria citrea. PROTHONOTARY WARBLER.—This bird is considered a rare migrant near Cleveland, fifty miles north of Wooster, and I am not aware of any breeding records for north-central Ohio. However at Myers Swamp near Wooster several were seen on May 8, 1926 and the species was common throughout the spring. One nest, containing six naked young, was found June 6 and they left the nest on June 17 wearing Biological Survey bands.—JAMES STEVENSON, *Wooster, Ohio.*

A Correction of "Some Notes from Southwestern Michigan."—In "Notes from Southwestern Michigan" in the April number of 'The Auk,' 1926, pp. 249–250, Mr. Pierce Brodkorb records the breeding of the Cardinal near Three Oaks, Michigan, and states that he "believes there are only about five previous records of its breeding in the State." There are records for Michigan (1837), reported by Dr. Sager of the State Natural History Survey, and Gibbs (1879) records a few taken in the southern part of the state. Since 1895 the species has become quite common in southern Michigan, and breeds in many places. Barrows, 'Birds of Michigan' (1912), records it nesting at Lansing. It was seen at Charlevoix in 1922, and has been reported from Marquette, in the upper peninsula. The species is a resident and breeds wherever it locates

Mr. Brodkorb also reports the breeding of the Tennessee Warbler in Muskegon County as "the first breeding record for Michigan." Barrows (l.c., p. 539) gives a record from Beulah, Benzie County, for August 4, 1906, and a probable record for Oscoda County in June, 1906.

On page 250, Mr. Brodkorb records the Carolina Wren from Duck Lake, Muskegon, which he "believes the most northern record for the state." Barrows (l.c., p. 669) records five taken by the writer on August 13 and 26, 1908, at Sand Point, Huron County.—NORMAN A. WOOD, *Ann Arbor, Mich.*

A New Species for Michigan.—Recently, while looking over the collection of birds in the Kent Scientific Museum, Grand Rapids, Michigan, the writer found a mounted Western Grebe (*Aechmophorus occidentalis*). It was taken at Fox Creek Station, Cascade Township, Kent County, Michigan, on February 17, 1917, and donated by Fred Esbaugh, Grand Rapids, Michigan. Barrows (1912) knew of no Michigan specimens, and although the species had been several times reported, he doubted the identification.—NORMAN A. WOOD, *Ann Arbor, Mich.*

Notes on Some Rare Birds of Northeastern Illinois.—The following birds, with the exception of the last three named species, are in the collection of Walter Schmidt at Wheeling, Ill., and were all collected on his farm at that place. He had no dates, and none of his specimens where sexed, but they testify to their occurrence here in the northern part of the state.

Cygnus columbianus. WHISTLING SWAN.—Two specimens were shot down out of a flock of fifteen in April, 1916. No recent records.

Cathartes aura septentrionalis. TURKEY BUZZARD. One taken May, 1926, while circling over the farm. W. Schmidt states that they occur regularly every spring, at his farm.

Haliaeetus leucocephalus leucocephalus. BALD EAGLE.—Formerly permanent resident, nesting in heavy timber on the Lake shore. Immature specimen taken in fall of 1918.

Pandion haliaetus carolinensis. OSPREY.—One taken spring 1926 at Schmidt farm. Also another specimen taken April 29, 1926, at Glencoe, Ill., now in the collection of the Highland Park Grammar School.

Strix varia varia. BARRED OWL.—Formerly common but now rare. Specimen in Schmidt collection taken November, 1923.

Corvus corax principalis. RAVEN.—One seen May 12, 1926, in heavy timber near home, by Henry K. Coale of Highland Park, Ill.

Loxia curvirostra minor. RED CROSSBILL.—Male brought into Glencoe Grammar School, February 1926.

Dendroica vigorsi. PINE WARBLER.—Adult male brought into Highland Park Grammar School, May 3, 1926, and now in its collection. Mr. Henry K. Coale states he has not seen one for forty years.—F. G. GRASETT, *Highland Park, Ill.*

Notes from Madison, Wisconsin.—*Pelecanus erythrorhynchos.* WHITE PELICAN.—I have asked Dr. W. V. Bryant to inform me of unusual water birds at Lake Kegonsa. Residence at the head of the lake, which is in the line of flight of migratory birds, combined with much time spent in the open, affords him exceptional opportunities for observation. He reported two White Pelicans at Mud Lake on April 15, 1926. Since he is very familiar with game birds and recently spent several months on an island in Charlotte Harbor, Florida, where I can personally attest that Brown Pelicans are abundant, I have no reluctance in accepting the record for this rare migrant.

Cygnus columbianus. WHISTLING SWAN.—This species is evidently increasing. In addition to seven seen by me on Lake Mendota, October 23, 1925, Dr. Bryant reports that four birds were sitting on the ice on Lake Kegonsa, April 10, 1926, and that on the following day a flock of forty flew northward. Dr. S. H. Chase reports a flock of seven seen by him on April 23, 1926. I have had several other reports to which I hesitate to give credence.

Harelda hyemalis. OLD-SQUAW.—Apparently only a rare winter visitor

inland, though this runs counter to the statement of Kumlein and Hollister. On January 19, 1913, a male was flushed at Lake Wingra from an opening formed by one of the springs. The intervening period of "watchful waiting" has failed to produce another record.

Oidemia deglandi. WHITE-WINGED SCOTER.—The writer shot a pair at Picnic Point, Lake Mendota, October 30, 1910.

Lobipes lobatus. NORTHERN PHALAROPE.—Rare migrant. An immature female was taken in a marsh near Madison on September 3, 1923. The bird was alone.

Limnodromus griseus scolopaceus. LONG-BILLED DOWITCHER.—An irregular migrant, occurring in small numbers. On May 17, 1925, in company with Mr. John Main, a flock of twenty-six, associated with Red-backed Sandpipers, was found at Lake Kegonsa. This is the largest flock by far that I have encountered. A female collected from a flock of four, on May 16, 1915, was referred to this form by Dr. Alexander Wetmore.

Pisobia fuscicollis. WHITE-RUMPED SANDPIPER.—Aside from birds seen, I have a male taken at "The Widespread" May 10, 1914.

Zonotrichia querula. HARRIS'S SPARROW.—In my experience, this species is far from regular. I saw one, October 21, 1917, and another, September 9, 1922, which I tried to collect, but without success. I finally took a female, May 16, 1926.

Spizella pallida. CLAY-COLORED SPARROW.—A regular migrant in small numbers. It bred near Madison in 1920 when I took a male on May 30, and another on June 27. It appears the first week in May and passes southward the end of September. I took a male May 2, 1926, my earliest previous record being May 3, 1924.

Dumetella carolinensis. CATBIRD.—I shot a female on December 20, 1925. The bird's flight was normal so I supposed that I had a sound winter record. On preparing the skin, however, I found that at one time the right humerus had been fractured near the elbow, but had healed perfectly. This incident is cited to show that caution is very necessary before assuming voluntary winter residence by certain species. The stomach contained fruit of the climbing bittersweet (*Celestrus scandens*).

Troglodytes aedon parkmani. WESTERN HOUSE WREN.—All the specimens of *Troglodytes* taken by me are easily referable to this form. In fact, I believe that *T. aedon aedon* is on the defensive and will have to justify its existence on the state list. This point is being investigated.

Hylocichla fuscescens salicicola. WILLOW THRUSH.—The skins so far submitted to Dr. H. C. Oberholser have been referred to this race. The status of *H. f. fuscescens* and *H. f. salicicola* in the state is being determined and the results will be published later.—A. W. SCHORGER, *2021 Kendall Avenue, Madison, Wisconsin.*

Avian Thyroids.—One field in ornithology, amongst many others into which ornithologists have made few excursions, is that of avian physiology. There are hints here and there in the work previously done in this field,

that further research may disclose conditions which have a direct bearing on questions heretofore considered purely ornithological (cf., Avian Gonads and Migration, Condor, July, 1926).

Unfortunately for bird students, many investigations already made relating to bird physiology have been published in journals rarely or never seen by ornithologists. Because of this fact attention is here directed to some data recently published in the 'Schweizerische Medizinische Wochenschrift' (Basel), April 17, 1926. In this article it is reported that the thyroids of male Crows shot in the fall and winter are larger than those of Crows shot in spring and summer. This thyroid enlargement and shrinkage is comparable to that of the gonads of birds, with however a reversed curve. There is definite evidence in mammalian physiology that the ovary and thyroid are mutually regulative; this recent publication on bird thyroids tends to show that this thyroid-ovary interaction obtains also with birds. It would be of much interest and value to determine if physiological thyroid hypertrophy and atrophy in migrating birds has a larger swing between extremes than in non-migrating birds.—W. H. Bergtold, *Denver, Colo.*

Passerine Birds Eating Trout Fry.—Mr. F. G. Bonfils of Denver has given me the following information, some of which is, to me, strange and entirely new:—At several places along the South Fork of the South Platte River in Colorado there are fishing clubs, which maintain ponds for the propagation of trout, which are later liberated in the main stream. Mr. Bonfils, while at the Wigwam Fishing Club in July, 1926, noticed a Robin picking food out of the shallow waters of the Club pond; to his amazement, on close examination he discovered that the bird was catching and eating small trout fry. This seemed so extraordinary that he took time to verify his discovery by a prolonged surveillance of the pond. Careful inquiry amongst the caretakers of the Club grounds disclosed the fact that they had been aware, for some time, of this fish-fry-eating habit of Robins, and also, that Brewer's Blackbirds and Magpies too, had the same habit. They reported the Spotted Sandpiper as also catching trout fry.

Mr. Bonfils learned that members and attendants of the Rainbow Fish Club, on the South Platte, above Deckers, had also noticed this habit in the Robins, Blackbirds and Magpies about the Rainbow Club, and had carefully verified it.

I have frequently seen Brewer's Blackbirds wading in the shallow waters of creeks and slews catching fresh water shrimps, and water insects, but never small fish. Such unusual habits give rise to interesting speculations as to the beginnings of avain differentiation.—W. H. Bergtold, *Denver, Colo.*

Effect of Fires on Pine Barren Bird Life.—The writer spent part of the month of June, 1926, in making a survey of the breeding birds of Ocean County. During the late winter and early spring large areas of the pine

barrens had been burned, and over wide sections much of the vegetation was destroyed. I was especially interested in noting the effects these fires had had upon the distribution of breeding birds, but it was not as marked as I had anticipated. On the dry barrens, covered before the fire by scrub oak, other low growths and pitch pine, the fires had reduced to some extent the numbers of nesting Brown Thrashers, and in a few cases Towhees, and resulted in a concentration of these two species in suitable cover about the fire district. Where the areas were burned quite clear, Nighthawks had come in to nest. But the distribution of Pine and Prairie Warblers seemed to be little affected except in areas where the flames had swept through after the nesting season had started. There was an increase in the number of Bluebirds in the burned areas and I believe some increase in Chipping Sparrows. I noted little effect upon numbers of Woodpeckers or Catbirds, and where the damage was slight and new growths of ferns, etc. gave cover, the number of Towhees was not reduced.—CHARLES A. URNER, *Elizabeth, N. J.*

RECENT LITERATURE

Chapman's Distribution of Bird-Life in Ecuador.—In 'The Auk' for April, 1918, it was our privilege to review at some length Dr. Frank M. Chapman's now classic work on 'The Distribution of Bird-Life in Colombia.' Since that time he has continued his studies of Andean ornithology and made several trips to more southern points in South America to strengthen his knowledge of the broader problems involved in the distribution of the birds—the general physical features, climate etc. etc. As the natural region for a second intensive study he selected the republic of Ecuador, lying just south of the field covered by his previous volume, and a country long noted for the richness of its avifauna, containing according to Dr. Chapman, one-fourth of all the species of South American birds and one-twelfth of those of the entire world. Here he concentrated his collectors and in a few years, mainly through the efforts of W. B. Richardson, Geo. K. Cherrie, Harry Watkins, Geoffrey Gill, G. O'Connell and the native collectors Olalla and Sons, the American Museum of Natural History obtained a series of some 13,500. Ecuadorean birds, which from the basis of Dr. Chapman's study which has just appeared from the press under the title of 'The Distribution of Bird-Life in Ecuador.'[1]

This is a portly volume of 784 pages with 30 plates, and 20 text figures.—including numerous photographic views of the country, maps, and five colored plates of birds from paintings by Fuertes and forms vol. LV. of the 'Bulletin' of the American Museum.

In all respects this is "Volume 2" of Dr. Chapman's study of the bird-life of the Andes, carrying on the same line of research as the Colombian report, confirming the statements there made and strengthening the theories there advanced. The method of treatment is also the same, with the same care and the same admirable handling of the subject. We can therefore do no better than to extend our favorable estimate of "Volume 1" to cover also the present work, and refer our readers to our review of it for many details which are the same in both. One decided improvement in the Ecuador report is the inclusion in the systematic section of all the forms so far recorded from the country instead of merely those obtained by the museum collectors, though the thoroughness of their work may be realized when we learn that of the 1357 species and 150 additional subspecies recorded from Ecuador all but 33 are represented in the Museum's collections, mainly by Ecuadorean specimens.

After an historical review of Ecuadorean Ornithology we have in Part I, considerations of the physiography of Ecuador, distribution of forests,

[1] The Distribution of Bird-Life in Ecuador. A Contribution to a Study of the Origin of Andean Bird-Life. By Frank M. Chapman. Bulletin of the American Museum of Natural History. Vol. LV. 1926. pp. i–xii + 1–784, pls. I–XXX, figs. 1–20.

climatic conditions, and life zones and their bird-life. This last section contains, as it were, the motif of the whole work—the application of the details enumerated in the systematic portion, which follows, to the working out of the life zones, their origin and the probable history of the development of the Andean mountain chain.

The characteristics of each zone are considered; the habitats which it exhibits, lists of characteristic species, with comparison with those of other zones, and finally the summary and conclusions.

This portion of Dr. Chapman's work is a really notable contribution to zoögeography and should be read by all intended in this fascinating field.

Part II, the systematic portion, naturally takes up the greater part of the volume and is an admirable piece of work, following almost exactly the plan adopted in the Colombian report. The new forms discovered seem all to have been described in preliminary papers.

Dr. Chapman professes "a profound lack of interest in questions of nomenclature, as such" and is willing to adopt a "statute of limitations or a perpetually closed season on synonymy hunting * * * the principles of *auctorum plurimorum*, *nomina conservanda* or any others that will prevent the ceaseless tinkering with names." We can heartily sympathize with him but like most writers, who make such protests he suggests no definite remedy. Perhaps some nomenclatural League of Nations may someday prevent the warfare of names but we must admit the outlook so far is not promising! And so like Dr. Chapman we each continue to select the names we like the best.

It is impossible in the space at our disposal to adequately review a work of the scope of the present volume. Our readers must consult it for themselves and they should all of them, read the discussion of the Andean life zones as it has an interest and bearing far beyond the limits of Ecuador. We congratulate Dr. Chapman upon another notable work which strengthens him in his position as one of the leading authorities on neotropical bird-life. We trust he may pursue his way down the Andes, leaving in his wake a whole series of these portly volumes and then turn his attention to the great Tropical lowland, stretching away from the mountains to the Atlantic, for none is better qualified for the task.—W. S.

Nesbit's 'How to Hunt with the Camera.'—There have been quite a number of books and articles on nature photography but none we believe which at all compare with Mr. Nesbit's sumptuous volume[1]. It is written, he tells us, not for the person who is content to push the button and trust to luck, but for those who are willing to give considerable thought and much hard work to the subject. All photographers of the latter class should undoubtedly possess the work if possible and will, we are sure, turn

[1] How to Hunt with the Camera. A Complete Guide to all Forms of Outdoor Photography. By William Nesbit. With many illustrations. New York, E. P. Dutton & Company, 681 Fifth Avenue. Quarto pp. i–xiv + 1–337. Price $10.00, postage extra.

to it again and again for the data and detailed information upon their favorite hobby with which its pages teem.

In the present connection we can do no more than present a brief outline of its contents, leaving those interested to study at leisure the portions of the book which pertain to the special topics in which they are interested.

Beginning with general suggestions for beginners we pass to a forceful plea for the better protection of our wild life, then comes Chapter III entitled "Branches of Photography" in which are considered animal and bird photography, aërial, astronomical and flash-light photography, flower and insect photography and the photography of lightening, snow and moonlight scenes, all interspersed with details regarding equipment and beautifully illustrated. There are also not a few diversions on the habits of the animals whose photography is being discussed, including quite a treatise on snakes, their habits, venom, etc.

Chapter IV consists of "Glimpses of the Vanishing Animal Kingdom of Africa," based on the leading publications on the subject and illustrated by Martin Johnson's wonderful photographs and others from the New York Zoo and the American Museum of Natural History. Next comes (Chapter V) a "Partial Who's Who in Nature Photography," with portraits and biographical sketches of such well-known photographers and writers as Akeley, Baynes, Burroughs, Dugmore, Chapman, Ditmars, Finley, Hornaday, Johnson, Roosevelt, Seton, Shiras and others.

The rest of the work, comprising nearly half of the volume, is devoted to the more technical side of the subject—cameras, lenses, development, exposure, flash-light apparatus and transparencies.—and contains a vast amount of technical data and valuable information.

The illustrations, beginning with the frontispiece—Mr. John M. Phillips' prize winning portrait of the Mountain Goat, form a most attractive presentation of the possibilities of nature photography and are contributed by the leading exponents of the art.

Mr. Nesbit is to be congratulated upon the splendid contribution that he has made to his favorite hobby and we feel sure that he will be successful in diverting many "gun hunters" to the ranks of the "camera hunters," for as he truly says many persons who would fain have become animal photographers have been discouraged by lack of knowledge of the camera and how to use it and this knowledge he has in this volume abundantly supplied.—W. S.

Dewar's 'Birds of an Indian Village.'—This little volume[1] is distinctly popular in character and is apparently intended primarily for the boys and girls, to judge by its intimate conversational style. The author's aim, as he tells us, is to interest the people of India in birds and bird study,

[1] Birds of an Indian Village. By Douglas Dewar and Illustrated by G. A. Levett-Yeats. Second Edition. Oxford University Press. 1924. (American Branch, New York. N. Y.) pp. 1–146. Price $2.00.

and as this is the first book of its kind written for Indian readers it must necessarily be elementary.

At the same time those of us who know Indian birds only from occasional specimens in zoological gardens can learn much from Mr. Dewar's pages and it is very interesting to ascertain something of the everyday habits of these far away birds and compare them with those of our own species.

The Hawk Cuckoo, for example, has a series of crescendo calls just as has our Yellow-bill, while the Crested Cuckoo is associated with the rainy season just as are our Cuckoos, which often go by the name of "Rain Crows." The Indian Cuckoos however are parasitic which ours are not and the complications incident to their parasitism are very interesting.

The illustrations by C. A. Levett-Yeats, while they give us some idea of the birds and their postures, are very crude as compared with what we are familiar with in popular American books. A convenient table at the end of the work gives in parallel columns the English, scientific and native names of all of the seventy odd species treated in the book.

If widely distributed Mr. Dewar's little volume should go far toward developing in the next generation a sympathy with birds and bird protection which more than anything else will aid in the preservation of the avifauna of this interesting country. —W. S.

T. E. and A. P. Penard on Bird Catching in Surinam.[1]—It seems strange in these days of bird protection to read of a country in which bird catching is systematically carried on, unless indeed it be in the interests of one of the bird banding associations, yet in Surinam we learn that bird catching is a very general practice. The birds are obtained for three distinct purposes—food, caging and in protection of crops.

The Messrs. Penard, who are well acquainted with the country and its inhabitants, describe in much detail and in an interesting way the several methods employed in this occupation. There is first the coop or fall trap, a sort of basket under which is placed the bait; then the trap cage of several compartments in one of which is placed a decoy bird, and which is often hoisted aloft among the branches of a tree where the song of the captive draws the unwary victims to the trap; and finally there is bird lime prepared from the sap of several native trees. Snares of horsehair were also extensively used in former times and young birds are often sought in the nests and captured just before they are able to fly.

There are interesting details of the methods of capturing certain species, especially Euphonias, which are in great demand as songsters, also accounts of their various songs and calls and the actions of both captive and wild individuals. The authors include the native names not only of the birds but of all the impliments used in bird catching as well as accounts of the popular beliefs and folklore relating to bird catching. The paper is a

[1] Bird Catching in Surinam. By Thomas E. and Arthur P. Penard. De West Indische Gids VII, 12. April, 1926. The Hague, Martinus Nijhoff, pp. 545–566.

most interesting contribution to a little known subject and added value is furnished by a number of photographic illustrations.—W. S.

Bangs and Phillips on a New Weaver Finch.—The bird here described[1] was collected by Emin Pasha in Tanganyka Territory in 1890 and upon comparison with a series obtained recently by Dr. Phillips in the West Nile region and eastern Congo it seems to represent a distinct southern race which is named *Icteropsis pelzelni tuta* (p. 177).—W. S.

Riley on Chinese Birds.—Further study of the collection sent to the U. S. National Museum by Rev. David C. Graham, from Szechwan, China, has resulted in the description[2] of a Ground Warbler belonging to a new genus and species *Antiornis grahami* (p. 55), and a new species of *Liocichla*,[3] *L. omeiensis* (p. 57). This genus was heretofore known only from a single species from the mountains of Formosa.—W. S.

Bangs and Peters on New Guinea Birds.[4]—Dr. Thomas Barbour has recently presented to the Museum of Comparative Zoology a collection of birds made by Thomas Jackson in 1920–24 in the region of Merauke, Dutch New Guinea. The locality is opposite Cape York and consequently has a strong Australian element in its fauna. Some 95 forms are represented in the collection of which only about one-third are Passeres.

Forms described as new are: *Geopelia humeralis gregalis* (p. 423) and *Gymnorhina tibicen papuana* (p. 431).—W. S.

Peters on Neotropical Birds.—In a recent paper[5] Mr. Peters reviews the races of *Elaenia martinica* of which he recognizes six. He shows that this species in addition to possessing two color phases, a gray and an olive-yellow one, exhibits great individual variation and is subject to fading during life, all of which make its study more complicated. *E. m. complexa* Berl. is shown to have been based upon a discolored individual while *E. flavogastra* of St. Vincent is a quite distinct species.—W. S.

In another paper[6] he describes as new *Dendroica petechia alsiosa* (p. 41) from the Grenadines.—W. S.

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[1] A New Race of Pelzeln's Weaver-Finch. By Outram Bangs and John C. Phillips. Occasional Papers of the Boston Soc. Nat. Hist. Vol. 5, p. 177. December 18, 1925.

[2] A New Genus and Species of Ground Warbler from the Province of Szechwan, China. By J. H. Riley. Proc. Biological Soc. Washington, Vol. 39, pp. 55–56. July 30, 1926.

[3] A New Species of Liocichla from the Mountains of Szechwan, China. By J. H. Riley ibid, pp. 57–58. July 30, 1926.

[4] A collection of Birds from Southwestern New Guinea (Merauke Coast and Inland). By Outram Bangs and James L. Peters. Bull. Mus. Comp. Zool. Vol. LXVII. No. 12, pp. 421–434. July, 1926.

[5] A Review of the Races of Elaenia martinica. (Linne). By James L. Peters. Occasional Papers of the Boston Soc. Nat. Hist., Vol. 5, p. 197–202. June 7, 1926.

[6] A New Race of the Golden Warbler from the West Indies. By James L. Peters. Proc. New England Zool. Club, Vol. IX, p. 41. February 17, 1926.

Birds, their Care and Propagation.—The present volume,[1] covering the Passeres, is the first part of a work proposed several years ago and intended to cover the care and breeding of all birds known to have been kept by aviculturists, with some account of the several species. Chapters of the work have appeared each month simultaneously in the 'Avicultural Magazine' and 'L'Oiseau' and these chapters are now gathered together and issued in book form.

Many of the articles are by M. Jean Delacour, chairman of the joint committee of the Societé Naturale d'Acclimatation and the Avicultural Society of London which was charged with the preparation of the work. Others are by such well known authorities on aviculture as Butler, Decoux, Legendre, Meade-Waldo, Seth-Smith and Shore-Bailey, each author writing upon the groups with which he has had the greatest experience. The introduction by M. Delacour treats of methods in aviculture, cages, aviaries, parks, etc.—in fact everything that keepers of birds should know.

The illustrations are numerous including all of those appearing in the journals above mentioned and others from some of the chairman's publications as well as photographs of his aviaries and grounds.

The work will prove of the greatest value to all interested in aviculture and will doubtless stimulate others to take up this fascinating pastime which attracts so much attention in England and France.

The present volume is entirely in French and we presume that a similar volume in English is in preparation.—W. S.

Holt and Sutton on South Florida Birds.[2]—This annotated list of 123 species combines the results of trips by E. G. Holt in January and February, 1924, and by George M. Sutton in March and April of the same year, to practically the same region in southern Florida, including the Royal Palm State Park, 'Gator Lake, Flamingo, Elliot's and Serberling's Keys, Cocoanut Grove and the Tamiami Trail for fifty miles west of Miami.

The paper consists entirely of field notes and no information is presented as to the extent of the collections obtained or their disposition although Mr. Holt was at the time connected with the Cleveland Museum while Mr. Sutton represented the Carnegie Museum of Pittsburgh.

The notes on the Wood Ibis colony and incidental remarks on the habits and actions of various species are interesting contributions to the life histories of Florida birds, while the beautiful colored plate of the Cape Sable Seaside Sparrow from a painting by Mr. Sutton will give many

[1] Les Oiseaux, leur Entretien, Leur Elevage. Manuel publié sous les auspices de La Société Nationale d'Acclimatation de France et l'Avicultural Society de Londres par un Comite mixte sous la direction de Jean Delacour. Vol. I Passereaux. Paris, Au Siège de la Société: 198, Boulevard Sain-Germain. 1925, pp. 1–384.

[2] Notes on Birds Observed in Southern Florida. By Ernest G. Holt and George Miksch Sutton. Annals of the Carnegie Museum, XVI, No. 3–4, 1926, issued April 10, 1926, pp. 409–439, pll. XXXIX-XLIV.

ornithologists an opportunity to appreciate the distinctness of this rare species, of which but few will ever see specimens. No mention is made of the locality where this bird was found nor of the number of specimens obtained for obvious reasons. There are other illustrations from photographs which add to the interest of the publication.—W. S.

La Touche's Handbook of the Birds of East China.—Part III of this work[1] maintains the high standard of the previous installments and covers the families Pericrocotidae, Artamidae, Dicruridae, Sylviidae, Regulidae, Oriolidae, Eulabetidae, and Sturnidae. We note but one new form described in the present part, *Cisticola exilis courtoisi* (p. 237) from South Yunnan, but as usual there is much valuable comment on the relationship and distribution of the various species.

Some of the groups here covered are difficult ones, notably the Sylviidae, and the full descriptions of the plumages of the 57 forms which occur in East China will be particularly welcome though it seems a pity that the author could not have included a key for their determination instead of referring to available keys in other works, which may not happen to be at the disposal of the reader.

Several photographic reproductions of characteristic scenery illustrate this installment of the work to which is added a valuable sketch map of east China.—W. S.

Duck Protection.—We have before us several publications dealing with the necessity for further limitation of the bag limit for game birds and water fowl in the United States as well as with the present abundance of Ducks.

Two of these unfortunately are anonymous and we are therefore in doubt just what weight to attach to them. Why anyone enough interested in game protection to write pamphlets for publication should wish to withhold his name we are at a loss to understand. The first publication[2] issued by "The National Committee of One Hundred" is a strenuous attack upon the present federal bag limit and the policies of the advisory committee of the U. S. Department of Agriculture. This publication is so full of extravagant statements and black letter type that it gives one the impression that its claims are not capable of presentation in a moderate and more convincing form.

Next there is a dignified pamphlet[3] issued by the National Association of Audubon Societies which purports to give the facts in the case and which puts the whole matter in a different light.

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[1] A Handbook of the Birds of Eastern China. By J. D. D. La Touche Part III. May, 1926, pp. 193–292, pll. VIII-IX and map. Price 7s. 6d. net per part. Taylor and Francis, Red Lion Court, Fleet St., London, E. C. 4.

[2] Wasting America's Game Birds. "National Committee of One Hundred." New York, January 5, 1926. pp. 1–61.

[3] Federal Power and Duck Bag Limits: Facts. A Study. National Association of Audubon Societies, Bulletin 6. 1974 Broadway, N. Y. Price 25 cents. 1926.

Finally there is the address of Dr. E. W. Nelson[1] before the Outdoor Recreation Conference on the present status of our wild fowl which is likewise not in accord with the statements given in the first publication.

There are and always will be extremists on both sides of all such questions as conservation and game protection whose extravagant statements may be discounted; but when "doctors disagree," and those who at one time worked together are opposed to one another, vast harm is done to the whole policy of conservation, the public becomes disgusted and do not know what to believe and legislative bodies do not know how to vote.

The same difference of opinion among the conservationists seems to have held up the national game refuge bill and doubtless will prevent action by Congress on bag limits or any similar subject. Meanwhile why cannot the extremists realize what harm they are doing and join with other forces in at least getting at the facts in the case. From entirely independent evidence we doubt very much the efficacy of bag limits on the rank and file of unprincipled and irresponsible gunners. Such men can easily get the bag limit again and again without detection.

It seems to be admitted on all sides that there are something like a million unlicensed gunners in the United States and that the unwarranted draining of marsh lands is depriving the Ducks of necessary retreats. Why not then concentrate upon remedying these conditions rather than publishing broadcast opposing views on bag limits. The U. S. Department of Agriculture has accomplished a great deal for conservation and the public we feel has not yet lost confidence in its officers.—W. S.

Recent Papers by Domaniewski.—M. Janusz Domaniewski has recently published a review of the Woodpeckers of the genus *Picumnus*[2] in which he recognizes no less than 52 species and subspecies. *P. irenae* (p. 292) from central Peru, *P. jelskii vitocensis* (p. 233) central Peru, *P. buffoni meridionalis* (p. 296) for *P. b. amazonicus* Snethl. preoccupied, and *P. punctifrons taczanowskii* (p. 297) n. e. Peru are proposed as new. A full bibliography of 151 titles and a plate complete the paper.

In another paper[3] he lists the Polish Anatidae and presents a key to the thirty-seven species with notes on three others of probable occurrence.—W. S.

Clark on Animal Voices.—This paper[4] is an interesting popular presentation of a subject to which Dr. Clark has given much attention

[1] Our Migratory Wild Fowl and Present Conditions Affecting their Abundance. By E. W. Nelson. Washington, D. C., March, 1926. (Mimeographed) p. 1–17.

[2] Uebersicht der Formen der Gattung *Picumnus* Temm. By J. Domaniewski. Annal. Zoöl. Mus. Polon. Hist. Nat. IV, 4, December 1, 1925, pp. 287–308 with one plate.

[3] Uebersicht einheimischer Formen der Familie Anatidae. By J. Domaniewski. Osobne odbicie z T. LX. Spraw. Kom. fizjogr. Polskiej Akademji Umiej. 1925, pp. 113–127

[4] Animal Voices. By Austin H. Clark Scientific Monthly January, 1926, pp. 40–48

and to which he brings his wide and varied knowledge of the animal kingdom. Briefly he regards sustained monotonous sounds ("keep away" sounds he terms them) as repellant, as the roar of the surf, the rattle of rattlesnakes and the buzzing of bees. Then there are the alarm cries so frequent in birds ("come to me" cries) in protecting their nests and young. These he regards as protective in as much as they at once attract the attention of other enemies which may be also enemies of the attacking creature, which will flee for safety upon their approach and give the victim a chance of escape. The repeated chirps of small active birds ("here I am" cries) are also protective as they call attention to the spot where the bird was when the cry was given but which it immediately left, thus continually confusing the pursuer, while the complicated songs of birds are claimed to have a similar bewildering effect upon their most frequent enemies, the Hawks, which habitually travel rapidly and do not therefore get the songs clearly and definitely located. Other confusing calls are the nocturnal utterances of Whip-poor-wills and similar species and these give rise to counter confusing cries of their enemies ("I'm after you" calls) which from their indefinite location in the dark bewilder their prey and throw them off their guard. It is inconceivable in our author's opinion that bird song is not part of the delicate protective adjustment that we recognize in nature in form, structure and color.

Minor functions of animal sounds Dr. Clark considers are to act as a sex stimulus and to keep migrant flocks and families together.

There is much food for thought in this paper and it will be read with interest by those who enjoy speculations as to the meaning of color, voice, etc., and doubtless the slight weight that he gives to bird song in connection with mating activities will be met by strenuous objection.

There is one paragraph that we think warrants serious consideration, not only in discussions of animal behaviour and development, but also in matters of conservation, where many of our policies are one-sided and may inadvertently aid in the very destruction against which we think that we are guarding, i.e.: "Every creature in the world is so beset with enemies that it leads the most precarious sort of an existance. Any false step means death. Any transgression of the rigid limitations within which life for it is possible, whether by individual variation in form or structure, or by unfortunate accident, means the prompt elimination of the individual so transgressing." How many individuals or species do we destroy or threaten with destruction by forcing upon them just such transgressions?—W. S.

McLellan on 'Birds and Mammals of the Revillagigedo Islands.'—This report[1] covers an expedition of the Californian Academy of Sciences

[1] Expedition to the Revillagigedo Islands, Mexico, in 1925, VI. The Birds and Mammals. By M. E. McLellan, Assistant Curator, Department of Ornithology amd Mammalogy, Proc. California Acad. Sciences, Fourth Series, Vol. XV, No. 11, pp. 279–322, May, 1926.

to the Revillagigedo and Tres Marias Islands undertaken in the spring and early summer of 1925, under the leadership of Dr. G. Dallas Hanna. Mr. Frank Tose chief taxidermist of the museum and his assistant Mr. J. T. Wright made the collection of birds and mammals here reported upon and the former prepared the field notes. No less that 548 bird skins and 29 mammals were obtained, the birds representing 112 species and subspecies and the comments, on the specimens, and notes on the life histories form a valuable contribution to our knowledge of the fauna of these interesting islands.

Dr. Hanna has published a general report[1] on the expedition and in his narrative are some additional notes on birds which are referred to in footnotes in Mr. McLellan's paper. Dr. Hanna's report also contains numerous illustrations many of them from photographs of living birds.—W. S.

Grinnell and Wythe on 'Birds of the Berkeley Campus.'[2]—This is not another local list but a four-page pocket checking list printed on cardboard and intended for use in recording daily lists on walks in the vicinity of the campus. Of the 135 kinds of birds now definitely recorded from the area 38 are resident, 21 summer resident, 37 winter visitants, 20 transients and 19 vagrants. The list is another of the numerous pocket card lists now so generally in use and so useful for keeping our local records.—W. S.

Mathews' 'The Birds of Australia.'—This great work[3] is rapidly pushing ahead to completion. and we now have before us Part 7 of Volume XII in which are considered, the Orioles, the Drongos, Starlings, Bower Birds and their close allies the Australian Cat Birds. No new forms are described in this installment.—W. S.

Van Oort's 'Birds of the Netherlands.'—We are in receipt of the complete text of Volume II of this great work[4] and the concluding plates of Volume III. The latter include the various plumages of the Black-backed Gull, the Herring Gull, Kittiwake, Ivory Gull and Sabine's Gull. There are also a number of Owls including the Short-eared, Snowy, Hawk and Barn Owls, likewise the Belted Kingfisher which has occurred in Holland as a straggler. The wealth of figures, illustrating all plumages from the downy young up, are of particular interest. The text as we have said before is unfortunately in Dutch but the work contains so much information on North American species that it should be in all our scientific libraries.

Volume I contains 244 pages of text and 87 colored plates covering the water birds with the exception of the Gulls, Shore-birds etc. and is issued

[1] Ibid. General Report. By G. Dallas Hanna., ibid, No. 1, pp. 1–113, March 30, 1926.

[2] Issued by the Museum of Vertebrate Zoology, Univ. of Calif.

[3] The Birds of Australia. By Gregory M. Mathews. Volume XII, Part 7, pp. 265–320.

[4] Ornithologia Neerlandica. Birds of the Netherlands. By Dr. E. D. Van Oort.

bound in half morocca at 160 guilders. The regular subscription is 135 guilders a volume and the work will be completed in five volumes.—W. S.

Natural Enemies of Insects in the Philippines.—In an extensive article[1] on 'Insects and their Control in the Philippines,' Faustino Q. Otanes, devotes some space to vertebrate enemies, of which he says: "Certain birds, mammals (both wild and domestic), reptiles, and amphibians, are of tremenduous value to agriculture as they feed chiefly on noxious insects. In fact leave enough of them and they alone will handle the job." The birds especially commended are Swallow-tails (*Merops?*) and the "martinez" (*Aethiospar cristatellus*). The latter species is that recently established in British Columbia and spreading, and about the economic future of which fears are expressed. The present author lauds its record in the Philippines where it is said to be an important enemy of locusts and other grasshoppers, crickets, cutworms, and ticks and other parasites of the carabao, with which beast the bird habitually associates.

Mr. Otanes cites the example of other countries, especially the United States, in bird protection, urges the formation of national, provincial, and municipal organizations in the Philippines to push the work, and of a research bureau to determine the fundamental facts. He notes that Governor-General Wood in a recent arbor-day proclamation called attention to the great value of birds in the control of insect pests.—W. L. M.

The Ornithological Journals.

Bird-Lore. XXVIII, No. 4. July–August, 1926.

A Flicker Movie with a Hand Camera. By W. C. O'Kane. Photographs of the young at the nest.

Peter. By M. M. Glidden.—Study of a young Purple Grackle.

Migration of North American Birds. By H. C. Oberholser.—The Nighthawks, with a colored plate by Fuertes and notes on plumages by Chapman.

"The Season" with its detailed reports from various sections occupies twenty-two pages and is becoming the largest feature of the magazine.

A very important article by Dr. A. A. Allen on 'Destructive Birds' is the feature of the Audubon Society department and should be read by every bird student. Among other good things we read, "and, above all, when the economic status of any species is called into question, if it has not already been studied in detail, let us ask for a competent investigation by the Biological Survey and stand by the recommendations of the investigator, whether they agree with our preconceived notions or not."

The Double-crested Cormorant is the subject of the educational leaflet by T. Gilbert Pearson.

The Condor. XXVIII, No. 4. July–August, 1925.

The Migration of the Cackling Goose. By Frederick C. Lincoln.

[1] Phil. Agr. Rev., 18, No. 4, (1925) 1926, pp. 396–398.

Angles and Speculations on Migration. By J. T. Nichols.

Breeding Birds of a White Mountains Lake. By E. A. Goldman—White Mountains of Arizona.

Birds of Northwestern Alaska. By A. M. Bailey.—Part X, concluded.

In 'Field and Study' there is a description of a new race of the California Woodpecker, *Balanosphyra formicivora martirensis* (p. 176) by Grinnell and Swarth and of the Say's Phoebe, *Sayornis saya quiescens* by J. Grinnell.

The Cardinal. No. 8. July, 1926.

Snowflakes. By E. W. Arthur.—A study of a flock seen in Mercer Co., February, 1926.

Long's Expedition of 1819. [By B. H. Christy.]—Extracts from the journal descriptive of the country about Pittsburgh.

Bulletin of the Northeastern Bird-Banding Association. II, No. 3. July, 1926.

A Nighthawk Study. By A. O. Gross.—A most careful study of a roof nesting pair.

Tree Sparrow Migration: A Comparison. By R. E. Horsey.

The Murrelet. VII, No. 2. May, 1926.

Speaking of Marbled Murrelets. By G. Willett.—Additional notes on this species.

Birds Observed in Idaho, Washington and Oregon. By J. B. Hurley.

Bird Notes from Eastern Washington. By J. L. Sloanaker.

Notes on the Prairie Falcon. By F. R. Decker.

Observations at Yakima, Washington. By J. V. Ellis, Jr.

The Ibis. (Twelfth series) II, No. 3. July, 1926.

Observations on the Altitudinal Distribution of Birds in the Swiss National Park. By W. H. Thorpe.

Additional Notes on the Birds of the Balearic Islands. By P. W. Munn.

A Review of the Subfamily Scolopacinae. Part I. The Snipes and Semi-Woodcocks. By Annie C. Meinertzhagen.—This is a most exhaustive study based on the collections of the British and Tring Museums, and a thorough study of the literature. Full descriptions of the various plumages and details of distribution are given, as well as much on habits.

The Birds of the Kangra District, Punjab. (Part I.) By Hugh Whistler.

On the Identification of *Eopsaltria cinerea* Cassin. By G. M. Bates.—Considers it as conspecific with *caerulescens* Hartlaub but that *cassini* Heine = (*lugens* Hartl.) is distinct. Both are placed in the genus *Alseonax*.

A Revision of the Genus *Gorsachius*. By M. U. Hachisuka.—Including the description of three new races of *G. melanolophus*.

Bulletin of the British Ornithologists' Club. No. CCCVI–CCCVII. July 13, 1926.

G. L. Bates describes *Streptopelia vinacea savannae* (p. 124) and *Cisticola robusta santae* (p. 125) from Cameroon; D. Bannerman, *Lamprocolius corruscus vaughani* (p. 126) Pemba Island, Zanzibar; and Col. Meinertzhazen, two races of *Siva strigula* in a review of the species.

British Birds. XX, No. 1. June, 1926.

Notes on Alberta Waders included in the British List. By William Rowan.—Part I covers the Killdeer and Semipalmated Plover and Part II (In July issue) the Golden and Black-bellied Plovers. Both are illustrated by photographs and the author's delicate drawings.

On Some New British Birds. By H. F. Witherby.—*Anthus gustavi*, *Acrocephalus agricola agricola* from the Shetlands and *Turdus musicus coburni* from Ross-shire.

Display of the Pied Watail. By Henry Boase.

British Birds. XX, No. 3. August, 1926.

Field Notes from Glamorgan. By Geoffrey C. S. Ingram and H. M. Salmon.

Some Notes on Bird Song. By E. Peake.

The Duration of Life in Birds. By H. F. Witherby.—A number of records of long lived captive birds.

The Avicultural Magazine. IV, No. 6, 7 and 8. June, July and August, 1926.

These numbers are largely occupied with articles on the various groups of Parrots. There are in addition, an article on 'A Trip to New Zealand' by Joseph Appleby [July] and one on the Princess Stephanie's Bird of Paradise. By Walter Goodfellow, illustrated by a colored plate. [August]

The Oölogist's Record. VI, No. 2, June, 1926.

A Catalogue of sets of Accipitres Eggs in the Collection of J. Parker Norris Jr. By J. Parker Norris, Jr.—Twenty-three species of Vultures represented.

The Piñon Jay. By J. K. Jensen.

Nesting of Baird's Sparrow. By T. E. Randall.

The Emu. XXV, Part 4. April, 1926.

Birds of the Capricorn Islands. By W. MacGillivray.

The Birds of Port Phillip. By Robert Hall.

Notes on a Visit to North Queensland. By W. B. Alexander.

Thornbills of the Genus Acanthiza. By A. G. Campbell. Part II.

Filming Lyre-birds. By R. T. Littlejohn.—With photographic reproductions from motion picture films.

Birds Introduced into New South Wales. By E. C. Chisholm.—Seven English species and two Indian.

Hunting Trick of the Man'o'war Hawk (*Fregata minor*). By Charles Hedley.—Breaking the wing of Terns etc. which did not respond to its demands to disgorge their food.

Numerous local notes, migration data, etc.

The Emu. XXVI, Part I. July, 1926.

Birds of the Caldwell District, Queensland. By H. Greensill Barnard.—Numerous excellent illustrations.

The Rock Warbler: A Monograph. By K. A. Hindwood.—*Origma rubricata.*

A Review of the Genus Cinclosoma, By A. J. and A. G. Campbell.

In the Haunts of the Heron. By M. S. R. Sharland. *Notophoyx novae-hollandae.*

The Vanishing Plain-Wanderer. By E. A. D'Ombrain.—*Pedionomus torquatus*, a species which is rapidly decreasing in numbers.

Birds of the Pallinup Estuary, W. Australia. By D. L. Serventy.

South Australian Ornithologist. VIII, Part 6. April, 1926.

Cape Barren Goose Appreciates a Sanctuary. By J. W. Mellor.—This interesting bird is absolutely protected in South Australia and in some of the other Australian states. A recent request to open the Lake Albert Sanctuary for shooting was fortunately refused.

North-East Eyre Peninsula.—Account of a trip in September and October by four Australian ornithologists with an annotated list of the birds seen numbering 125 species. Unfortunately no author's name appears.

Revue Francaise d'Ornithologie. No. 205. May, 1926. [In French.]

The Pitchou (*Sylvia undata* subs.) By J. de Chavigny.

The Alpine Titmouse. By H. Jouard. Second appendix.

Some New Observations of the Colonies of *Ardea cinerea cinerea* in France. By J. de Chavigny.

Revue Francaise d'Ornithologie. No. 206–207. June–July, 1926. [In French.]

An Ornithological Excursion to the Camaret Region. By J. Rapine.

Bibliography of Faunal Ornithological Papers of France. By M. Legendre.

L'Oiseau. VII, Nos. 3, 4, and 5. March, April and May, 1926. [In French.]

These numbers contain the same articles on Parrots that appear in the 'Avicultural Magazine' while there is an account of the collection and aviaries of Emile Pannetier by A. Decoux [March] and one entitled 'Ornithological Notes from Iceland' with photographic illustrations by M. Hachisuka also an account of *Oenanthe leucopyga aegra* with a colored plate. [May]

Le Gerfaut. 16, fasc. II–III. 1926. [In French.]

Entirely local notes from Belgium.

Tori. V, No. 21. May, 1926. [In Japanese.]

Photograph of the Welcome Meeting of the Ornithological Society of Japan for Mr. J. Delacour.

Two Examples of female birds assuming male plumage. By T. Momiyama.—Two plates of a Pheasant and a Duck.

On Birds from Alexandria, Russian North Sakhalin. By Y. Yamashina.

Cranes of the World. By N. Kuroda.

Astronomy and Birds. By R. Furukawa.

On a Small Collection of Birds from Cape Provence, South Africa. By N. Kuroda. [In English.]

Norsk Ornithologisk Tidsskrift. 2nd series, VII. 1926. [In Norwegian.]

Eggs of *Motacilla cinerea*. By G. Hoy.

Breeding of *Coccothraustes coccothraustes* and *Larus ridibundus* in Osla. By F. Okland.

Norwegian Migration Dates. By P. Hakenstad and O. Pettersen.

Bird Fauna of Namdalen. By H. T. L. Schaanning. Also local notes by the same.

Journal für Ornithologie. LXXXIV, No. 3. July, 1926. [In German.]

Bianchi on the Birds of North Russia, Finland and the Balkan States. By H. Grote.—A tabulated résumé of Bianchi's work.

Remarks on the Biology of the Swan. By E. Christoleit.

N. A. Sarudny and his Last Work. By F. Steinbacher.

New Forms of Ptarmigan. By P. Sserebrowsky.—*Lagopus lagopus rossicus* (p. 511), Gouv. Riasan; *L. l. kapustini* (p. 512) Lappland; *L. l. birulai* (p. 513) Kotelnyi Isl.

Contribution to the Distribution and Life History of the Birds of German East Africa. By L. Schuster II.

On the Question of Transformation of Dark to Yellow Melanin. By F. K. Glasewald.

On a Small Collection of Birds from Bali. By Victor Baron von Plessen.

Ornithologische Monatsberichte. 34, No. 4. July, 1926. [In German.]

On the Life and Nesting of *Collocalia francica vestita*. By P. F. Frank.—Remarkable photographs of nesting colonies.

On Our Knowledge of the Edible Nest Swiftlet of Southeast Borneo. By E. Stresemann.—Described as *Collocalia lowi tichelmani* (p. 104) as distinct from *C. francica mearnsi* from the same region.

A New Form of *Microscelis madagascariensis*. By O. Neumann. *M. m. albiventris*.

Short Notes from Crete. By G. Schiebel.

Contributions to the Development of Birds. II, No. 4. July, 1926. [In German.]

Two Theories on the Life History of the Cuckoo. By V. Capek.

On the Nesting of *Remiza*. By F. Steinbacher.

Some Notes on the Beginning of the Nesting Season in North Africa. By O. Graf Zedlitz.

Der Ornithologische Beobachter. XXIII, Nos. 7, 8, and 9. April, May and June, 1926. [In German or French.]

Mainly notes on Swiss birds and on bird protection, but contains also a continued article on observations in Egypt and the Egyptian Sudan by A. Mathey-Dupraz.

Yearbook of the Netherlands Ornithological Club. 16, Afl. 1. June, 1926. [In Dutch.]

Taken up entirely with a report on a collection of birds from Java and Sumatra by Snouckaert van Schauberg.

Ornithological Articles in Other Journals.

Gladstone, Hugh S. White Wild Geese (*Scottish Naturalist*, No. 158 March–April, 1926).—Albino Barnacle, Gray Lag, White-fronted, Canada and other Geese.

Robinson, H. W. Percentage of Recovery of Ringed Birds in Great Britain and Hungary. (*Scottish Naturalist*, No. 158, March–April, 1926.)

Baxter, E. V. and Rintoul, L. J. Some Effects of Hard Weather on Bird Life in East Fife. (*Scottish Naturalist*, No. 157, Jan.–Feb., 1926).

Stenhouse, J. H. Bird Notes from Fair Isle. (*Scottish Naturalist*, No. 157, Jan.–Feb., 1926.)—Occurrence of Iceland races, etc.

Walch, J. W. Birds of Brunswick, Me. (*Maine Naturalist*, VI, No. 1, March, 1926.)

Newsome, J. E. Hunting with Animal Blinds in Merced Co. (*Calif. Fish and Game*, XII. No. 1. January, 1926.)—Using a trained live steer alongside which the gunner walked.

Brown, E. J. Wilson's Warbler (*Canadian Field Naturalist*, March, 1926).—With photographs of the nest.

Bond, James. Ornithology of Northern New Bruswick. (*Canadian Field Naturalist*, April, 1, 1926.)—Notes on the nesting warblers.

Taverner, P. A. Scientific Advice for Wild Life Conservationists. (*Canadian Field Naturalist*, April, 1926.)—Excellent advice on employing trained men for conservation work. Said to be not over a dozen professed sportsmen in Canada who can name correctly the game they are supposed to shoot.

Eaton, W. F. Summer Birds of Vermont. Particularly on the Long Trail through the Green Mountains. (*Bulletin of the Vermont Botanical and Bird Clubs*, No. 11, January, 1926.)

Burrows, G. H., and Perkins, H. F. A Study of the Gulls of the Four Brothers Islands. (*Bulletin of the Vermont Botanical and Bird Clubs*, No. 11, January, 1926.)

NOTES AND NEWS.

Sir John Francis Julius von Haast, a Corresponding Member of the American Ornithologists' Union elected in 1884, died at Christchurch, New Zealand, August 16, 1887. His death was the second reported in the list of Corresponding Members, but no account of his work has ever appeared in the pages of 'The Auk.'

Julius von Haast was born at Bonn, Germany, May 1, 1882.[1] He was the son of a wealthy merchant and received his early education in the grammar schools at Bonn and Cologne. After graduation from the University of Bonn, where he specialized in geology and mineralogy, he spent some time in scientific exploration in Austria, Belgium, France, Italy, and Russia. Having translated a German book for emigrants for an English firm interested in developing emigration to New Zealand, he was invited by the firm to represent them in that colony. On December 2, 1858, he arrived in Auckland, N. Z., and the following day the Austrian man'o war 'Novara' carrying a scientific expedition on its voyage around the world anchored in the Bay. At the request of the government authorities, the geologist of the expedition, Ferdinand von Hochstetter, was invited to investigate some coal seams which had recently been reported in the vicinity, and leaving the 'Novara' for that purpose took with him von Haast, whom he had met shortly after his arrival. For nine months the two geologists explored various parts of the island before Hochstetter returned home. Von Haast was then engaged by the Government of Nelson Province to undertake an investigation of that Province. In 1860 he was employed by the Province of Canterbury to survey a line for a tunnel through the hills between Christchurch and the port of Lyttelton. In the following year he became the first Government Geologist in the Colony and during the next few years vigorously prosecuted investigations in the South Island, especially in the Mt. Cook district and the region of the southern Alps, where he discovered, named and mapped many of the great glaciers. The results of these investigations appear in his chief work 'The Geology of the Provinces of Canterbury and Westland,' published at Christchurch in 1879. In 1886 he was appointed New Zealand Commissioner at the Indian and Colonial Exposition in London, and received the honor of K.C.M.G. Upon completion of his work at the Exposition he made a trip to the principal museums on the continent in the interests of the museum at Christchurch. He returned to New Zea-

[1] Several discrepancies in the date of birth and place of death appear in various published biographies. The date of birth is given as 1822 by German authorities and 1824 by English authorities, as in 'Nature,' 1887, p. 87, and in Proc. Royal Soc. of London, 46, p. XXIV, 1889. The place of death is erroneously given as Wellington, N. Z., in Myer's 'Konversationlexikon,' and as Bonn, Germany, in 'The Auk,' 1889, p. 96.

land in the summer of the following year and within a month died suddenly at his home on August 16, 1887.

While primarily a geologist, Dr. von Haast had broad interests and published many papers on various subjects of natural history. In recognition of his geological work he received the honorary degree of Ph.D. from the University of Tubingen. He was a founder of the Philosophical Institute of Canterbury, of which he was President in 1862, and of the Canterbury Museum, of which he was Director for several years. He was also Professor of Geology in the Canterbury College at Christchurch and was elected a Fellow of the Royal Society of London. He was particularly interested in the Moas of which he described several new genera and species, including *Euryapteryx*, *Meinornis* (*Anomalopteryx*) and *Megalapteryx hectori*. His contributions on the subject number about 25 titles most of which may be found in Hamilton's bibliography of the Dinornithidae (Trans. & Proc. N. Z. Inst., 36, p. 236, 1893, and 37, p. 238, 1894). His last two papers on the Moas published a year before his death in the Transactions of the Zoological Society of London, are devoted to *Megalapteryx* and *Dinornithidae*. In recognition of his work his name is preserved in the designations of several of the birds of New Zealand, viz. *Apteryx haasti*, *Emeus haasti* and *Palaeocasuarius haasti*.

Several biographical sketches of von Haast have been published, among the more important of which are those in 'Nature,' vol. XXXVII, p. 87, Nov. 24, 1887; in the 'Sitzungsber. Akad. Wiss.,' Munich, 1888, pp. 176-181; and in the 'Verhandl. Naturhist. Ver. Rheinlande Westfalens,' Bonn, 1887, pp. 219-232.—T. S. P.

Frank Morley Woodruff. The many friends of Frank M. Woodruff will be shocked to hear of his death which occurred in Chicago, July 21, 1926. Mr. Woodruff, an Associate of the A. O. U. since 1894, was a well known bird student and photographer, and as Curator of the Chicago Academy of Sciences had made an enviable reputation for his life-like reproductions of the environs of Chicago.

He was born in Leavenworth, Kansas, July 16, 1867. As a boy and young man he was quite frail, and kept to the out-of-doors as much as possible. In 1884 he traveled to Deer Park, Maryland, where he collected birds and animals, and developed the powers of observation which stood him in good stead in preparing the material which he was later to publish as a bulletin of the Chicago Academy of Sciences, 'The Birds of the Chicago Area.' In 1888 he was associated with Colonel Francis W. Parker at the Cook County Normal School. In 1892-93 he assisted in collecting and mounting the Illinois State Ornithological Exhibit at the World's Fair in Chicago. From that time on he was connected with the Chicago Academy of Sciences, first as Taxidermist, then as Assistant Curator, and finally as Curator.

His 'Birds of the Chicago Area' was published in 1907 as Bulletin Number VI of the Natural History Survey of the Chicago Academy of

Sciences. Before and since that time he contributed occasional articles to various scientific journals, among which were the 'Wilson Bulletin,' and 'The Auk.'

As a photographer of flowers, trees, birds and captive wild animals, he was rated very highly, and as an informal lecturer on these subjects he was much in demand. His chief work, however, was the construction of the Chicago Environs Groups which have made the Chicago Academy of Sciences famous throughout the world. These large groups are masterpieces of photography and scientific skill. He was the originator of the method of using great photographic enlargements as backgrounds for his groups. So successfully has this been done that the principal scenic and scientific features of the Chicago Region have been telescoped into the comparatively small space of 260 feet.

Mr. Ruthven Deane says "It is needless to say how we all regret that he could not have been spared until the completion of the great groups on which he had worked so long."—W. F. Worthley.

John Burnham, an Associate Member of the American Ornithologists' Union since 1920, was stricken with heart failure and died in his office at San Diego, California, on the morning of March 27, 1926. He was born in London, England, on December 9, 1867 and came to America at the age of fourteen. For twenty-six years he resided in Minnesota, where in 1892 he married Carrie M. Crothwer. From Minnesota he moved to San Diego in 1907.

For over thirty years he was an earnest student of bird life, devoting his particular attention to building up a collection of birds' eggs. Of his Minnesota days his widow writes: "He would leave his home at daylight on Sunday morning with his knapsack on his back, his note book, field glasses and collecting box, and tramp the fields and woods all day. Specimens had to be prepared after his business house closed at night. Then stores were open from 7 A.M. to 9 P.M. continuously six days a week, so often twelve o'clock at night would find him working industriously over specimens he had taken."

When he went to California he took with him a well-started collection of eggs, but during the first ten years of his residence in San Diego, he was able to find little opportunity to add to it. From about 1918, however, until the time of his death, his spare time was devoted to his hobby with renewed devotion. During these years he collected chiefly in San Diego County, but he made trips into other parts of California and also Mexico. On the very day of his death he had planned a trip afield with Albert M. Ingersoll, his close friend and co-worker.

The egg collection he has left, and the data accompanying it, are models of their kind. Representing for the most part personal work, rather than purchase or exchange, the collection is admirably catalogued and accompanied by extensive and valuable notes written at the close of each day's field trip. The orderly arrangement of the trays, the clever devices

for holding nests and the neatness of all hand-written documents reflect the accurate and methodical mind of the collector.

At the time of his death, Burnham, in addition to being an Associate of the A. O. U., was Secretary-Treasurer and Honorary Curator of Ornithology of the San Diego Society of Natural History, a Patron and Honorary Curator of Birds of the Zoological Society of San Diego, Treasurer of the San Diego Scientific Library Association, Treasurer of the San Diego Floral Association, Member of the San Diego Museum Association, Member of the Cooper Ornithological Club and Member of the Wilson Ornithological Club. He is survived by his widow, and three children, Hazel, Donald and Gordon. His egg collection was maintained as "The Oological Collection of John and Gordon Burnham," and for the present it will be continued by Gordon and Mrs. Burnham—herself an enthusiastic collector. Much of Burnham's ornithological library and all his bird specimens have been donated by his widow to the San Diego Society of Natural History, whose oological collection has been augmented many times by gifts from Burnham during his life-time.—C. G. A.

Marston Abbott Frazar, well known taxidermist and president of the M. Abbott Frazar Co., of Boston, Mass., died Oct. 1, 1925, after an illness of nearly two years. He was born at Watertown, Mass., July 1, 1860, and was the son of George A. Frazar, a shipbuilder and Chinese importer, and Caroline Marston Sampson Frazar, a descendant of prominent Colonial ancestry.

At an early age he developed an interest in natural history and after attending the Chauncey Hall School for seven years began his work in natural science. At the age of 16 he was elected a member of the Nuttall Ornithological Club and retained his membership until 1892. In 1881 he made a collecting trip to San Domingo for Charles B. Cory and late in 1886 left for Lower California to collect for William Brewster. Reaching La Paz Jan. 24, 1887, he spent practically all of that year in the southern part of the peninsula and secured a collection of 4400 well prepared birds which formed the basis of Brewster's 'Birds of the Cape Region of Lower California,' published in 1902.

In 1889 he purchased the taxidermist establishment at 93 Sudbury St., Boston, which had been in operation 20 years and organized the M. Abbott Frazar Co., taxidermists and dealers in natural history specimens and supplies. Later on he purchased raw furs and developed the fur side of the business. He was a prominent citizen of Brookline, an officer in the Boston Association of Fur Manufacturers and a member of the Boston Chamber of Commerce.

Mr. Frazar published comparatively little on birds, chiefly in the form of brief notes in the 'Bulletin of the Nuttall Ornithological Club' and a single note in 'The Auk.' From 1876 to 1881 he changed his name to Abbott M. Frazar and most of these notes appear under that form of his name. Many of his local records of Massachusetts birds were published

in Brewster's 'Birds of the Cambridge Region' and thus are generally accessible. His ornithological work is commemorated in the names of four of the birds which he collected: a Flycatcher from San Domingo (*Contopus frazari* = *Blacicus hispaniolensis*), and three species from Lower California, a Green Heron (*Butorides virescens frazari*) from La Paz; an Oystercatcher (*Haematopus frazari*) from Carmen Island; and a Yellowlegs (*Totanus melanoleucus frazari*) from San Jose del Cabo.—T. S. P.

The Baird Ornithological Club of Washington, D. C. held its Fourth Annual Meeting on March 2, 1926, at which officers for the year were elected as follows: President, Leonhard Stejneger; Vice President, Alexander Wetmore; Secretary, B. H. Swales; Members of the Council, Charles W. Richmond, T. S. Palmer. O. J. Murie was elected an Active Member on February 4, 1926. During the year papers were given before the organization by Doctors Sushkin, Palmer, Wetmore, Stejneger, and Fisher, and Messrs. Kalmach, Goldman and Lincoln.—B. H. Swales, Secretary.

M. Charles Aiken the veteran ornithologist of Colorado Springs, Colo., celebrated his seventy-sixth birthday on September 7, 1926.

Mr. George E. Osterhout of Windsor, Colo., has presented his entire collection of birds numbering about 600 specimens to the Colorado Agricultural College. It is, especially rich in Ducks, Shorebirds and Birds of Prey.

The Federation of Bird Clubs of New England working in conjunction with the Massachusetts Fish and Game Association has done much to stimulate interest in the attempt to save the Heath Hen from extinction. Destructive birds and animals have been kept in check on Martha's Vineyard where the remnant of this species still persists and rabbit hunters in the autumn have been watched. The result is that on a visit to the island March 27–April 3, 1926, Prof. A. O. Gross found that there were apparently 35 birds present, a few more than estimated a year ago. The birds range over an area of 12,000 acres, mainly covered with low oak scrub which makes an actual count impossible.

The Tenth International Congress of Zoological will be held in Budapest, Hungary, September 4–9, 1927, under the presidency of Dr. G. Horváth of the Hungarian National Museum.

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ERRATA.

Page 16, line 25, for "Arthur" read Anthon.
Page 132, line 27, for "Ornsthologie" read Ornithologie.
Page 251, line 13, for "*Cataptrophorus*," read *Catoptrophorus*.
Page 252, line 13, for "Narrowa" read Narrows.
Page 375, line 40, for "March" read May.
Page 385, foot note, for "Uraguay," read Uruguay.

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1	1883, Sept. 26–28	1st New York	21	23
2	1884, Sept. 30–Oct. 2	2d New York	16	143
3	1885, Nov. 17–18	3d New York	16	201
4	1886, Nov. 16–18	1st Washington	20	251
5	1887, Oct. 11–13	1st Boston	17	284
6	1888, Nov. 13–15	2d Washington	20	298
7	1889, Nov. 12–15	4th New York	20	400
8	1890, Nov. 18–20	3d Washington	20	465
9	1891, Nov. 17–19	5th New York	14	493
10	1892, Nov. 15–17	4th Washington	20	557
11	1893, Nov. 20–23	2d Cambridge	17	582
12	1894, Nov. 12–15	6th New York	15	616
13	1895, Nov. 11–14	5th Washington	19	667
14	1896, Nov. 9–12	3d Cambridge	14	673
15	1897, Nov. 8–11	7th New York	18	679
16	1898, Nov. 14–17	6th Washington	21	695
17	1899, Nov. 13–16	1st Philadelphia	16	744
18	1900, Nov. 12–15	4th Cambridge	19	748
19	1901, Nov. 11–14	8th New York	18	738
20	1902, Nov. 17–20	7th Washington	25	753
20a	1903, May 15–16	1st San Francisco	7	—
21	1903, Nov. 16–19	2d Philadelphia	19	775
22	1904, Nov. 28–Dec. 1	5th Cambridge	17	808
23	1905, Nov. 13–16	9th New York	17	860
24	1906, Nov. 12–15	8th Washington	24	750
25	1907, Dec. 9–12	3d Philadelphia	20	850
26	1908, Nov. 16–19	6th Cambridge	17	888
27	1909, Dec. 6–9	10th New York	19	866
28	1910, Nov. 14–17	9th Washington	23	897
29	1911, Nov. 13–16	4th Philadelphia	18	887
30	1912, Nov. 11–14	7th Cambridge	18	929
31	1913, Nov. 10–13	11th New York	28	992
32	1914, Apr. 6–9	10th Washington	27	1101
33	1915, May 17–20	2d San Francisco	11	1156
34	1916, Nov. 13–16	5th Philadelphia	26	830
35	1917, Nov. 12–15	8th Cambridge	21	891
36	1918, Nov. 11	12th New York	14	953
37	1919, Nov. 10–13	13th New York	28	1024
38	1920, Nov. 8–11	11th Washington	25	1142
39	1921, Nov. 7–10	6th Philadelphia	25	1351
40	1922, Oct. 23–27	1st Chicago	24	1457
41	1923, Oct. 8–12	9th Cambridge	25	1652
42	1924, Nov. 10–13	1st Pittsburgh	26	1637
43	1925, Nov. 9–12	14th New York	30	1705

The next regular meeting—the 44th Stated—will be held at Ottawa Canada, October 11–14, 1926.